

An Information System for Swimming  
Lesson Enrolment and Management

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Management Minor

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## Summary

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This project was carried out to analyse the business, assess the feasibility of potential solutions and create a new database system for swimming lesson enrolment. It was additionally required that the system helps deal with the financial management of the swimming lessons.

A solution was needed because the current system incorporates all the down falls that any paper based system does. Further more, a merger of the leisure centre with the private health club added to these problems.

Usability was paramount to any solution due to the previous failings of a tried system. Due to this reason, the trialled system was analysed thus helping create a more acceptable solution that would be less likely to fail.

## Acknowledgements

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# **1. Introduction**

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## **1.1. Introduction**

Kirklees Active Leisure (KAL) is a trust formed from the former Kirklees Council Leisure and Recreation department. They have several sites throughout Huddersfield. The main site for swimming lessons is the Stadium Business and Leisure Complex. The site has potential for a turnover of almost five hundred swimmers every thirteen weeks and currently has a paper based system for the swimming lesson enrolment and the management of the lessons. This has many problems and due to a recent merger with the on site private gym these problems have increased. The management have highlighted that a solution is needed.

## **1.2. Problem Statement**

The current system has many problems, mostly comprising of the typical problems related to any paper based system, namely; the loss of documents, hand written and illegible records, unprofessional appearance, storage space and the inefficiency or cost of replicating and/or backing up documents. The recent merger with the Stadium Health and Fitness club, which means the reception is now shared, has enhanced the size of these problems.

## **1.3. Project Aim**

The aim of this project was to analyse the information needs, the business processes and people involvement in swimming lesson enrolment and management followed by a design and implementation of a prototype system that will help the enrolment procedure, the people management and the financial management aspects of swimming lessons.

## **1.4. Project Objectives**

The objectives of the project as a whole are:

1. To research a number of methodologies such as SSM, ETHICS, Prototyping and the Waterfall model in order to determine a suitable model for this project.
2. To analyse and document the current system and business processes.
3. To produce a feasibility study detailing possible solutions and identify the best solution.
4. To research into HCI in order to create a professional interface.
5. To involve the end users as much as possible in the design and the build of the system (where relevant and where it is possible i.e. due to their work commitments).



6. To create a prototype system that includes as many functionalities as is possible in the time available in order to create an ideal solution.
7. To evaluate the product via a test run and end user feedback.
8. To create user documentation in order to aid the end user.

### **1.5. Minimum Requirements**

The minimum requirements for the project are:

1. To implement a prototype database that covers the user requirements.
2. To create a report detailing HCI findings.
3. To evaluate the system via a report of a trial run of the system at an enrolment session.
4. To create user documentation on the system.

### **1.6. Further Extensions**

1. To develop an aesthetic and usable interface to the underlying database based on the HCI report.
2. Further development based upon the evaluation of the prototype.
3. Research into the possibilities of integration with a swipe card data input method.
4. Actual Integration with a swipe card data input method.
5. Hand over and integrate the system into current working practice.
6. Evaluation the effectiveness of the handover.

### **1.7. Deliverables**

The deliverables for this project are:

1. The project report.
2. A functioning prototype – deliverable to Kirklees Active Leisure.
3. User documentation/User Manual – deliverable to Kirklees Active Leisure.

### **1.8. Relevance to Degree Programme**

This project has called upon my knowledge, skills and experience gained from a range of modules taken as part of my degree programme and in addition to the experiences gained from my year in industry. All projects irrelevant of size require good planning and time management, my experience of this has been taken from SE22 – Software Project Management and also from time spent at Nestle on my industrial placement, working in a project implementation team, albeit a very large scale project. It is also essential that projects follow a chosen methodology, of which, a range have been covered in such modules as IS11 – Introduction to Information Systems, IS21 –

Object Oriented Analysis and Design, IS33 - People-Centred Information Systems Development and SE22. The tools which have been used in order to follow these methodologies have been learnt and developed via IS21, SE22 and IS33. The actual implementation of the database used theories taught in DB11 – Introduction to Databases and DB21 – Database Practice and Principles, in addition my experience gained whilst on placement were a great help.

As well as the above, my experience and knowledge of the swimming lessons and associated procedures gained through employment with Kirklees Active Leisure has been invaluable.

### 1.9. Schedule

Below is the original schedule for the project, which was updated after a mid project review, the updated version can be found in the Appendix B.

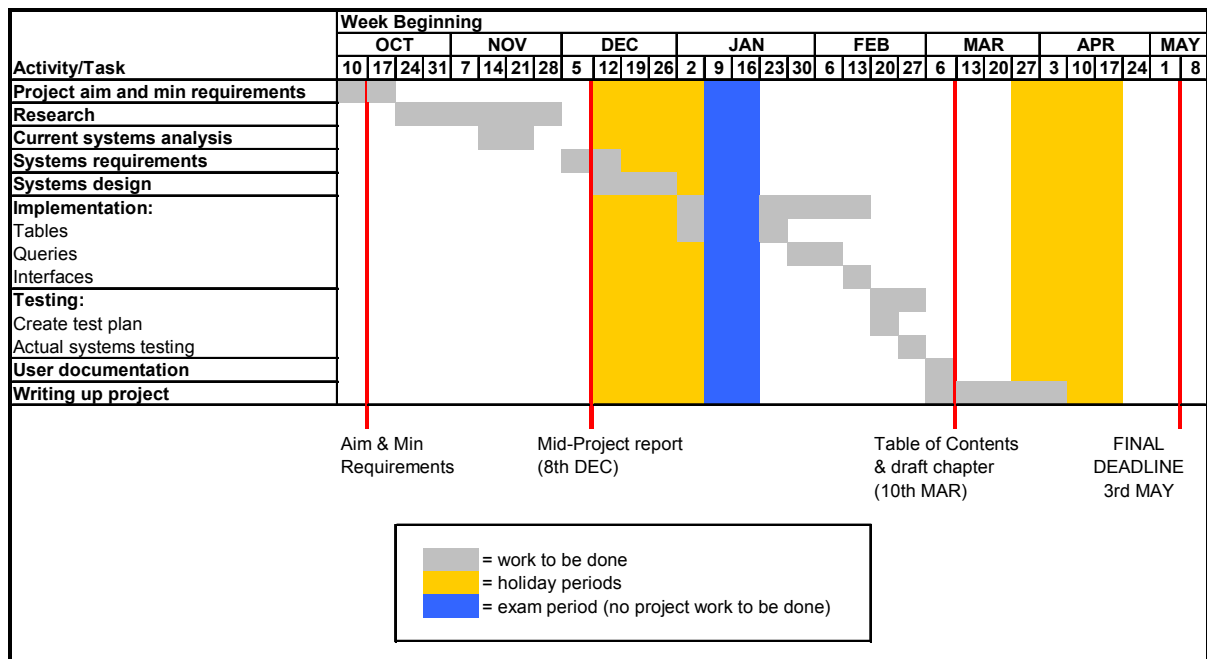


Figure 1.1: the project schedule.

## **2. Background Research**

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### **2.1. Project Management**

All projects require management in order to minimise risk, add business value and control time and costs [1]. It is possible to define several stages of a project:

- The defining stage, which sets out what is to be done, thus reducing uncertainty and increasing efficiency.
- The executing stage, which can be controlled by selecting an appropriate methodology to follow.
- The controlling stage which will ensure that deliverables are produced on time.
- The closing stage, which is another way of wording the evaluation.

### **2.2. The Need for a Methodology**

All projects need to follow a set structure called a methodology which helps define the steps need to be taken. Jason Charvat [2] states that every project needs a strategy (or methodology) and that the strategy must be realistic and agreed to by everyone involved. Additionally, he states, good strategy leads to good results. It is also common thought that a methodology provides for clear and precise missions, aims and objectives and aids with project management.

### **2.3. Selecting a Methodology**

In order for me to select an appropriate methodology it is vital that I looked into the possibilities. There are a number of publications, including Charvat [2], Avison and Fitzgerald [3] and Olle [4], which describe a range of methodologies – each of which is detailed.

#### **2.3.1. Conventional Systems Development**

The Conventional Systems Development is depicted by the Waterfall model in that it has a series of sequential steps:

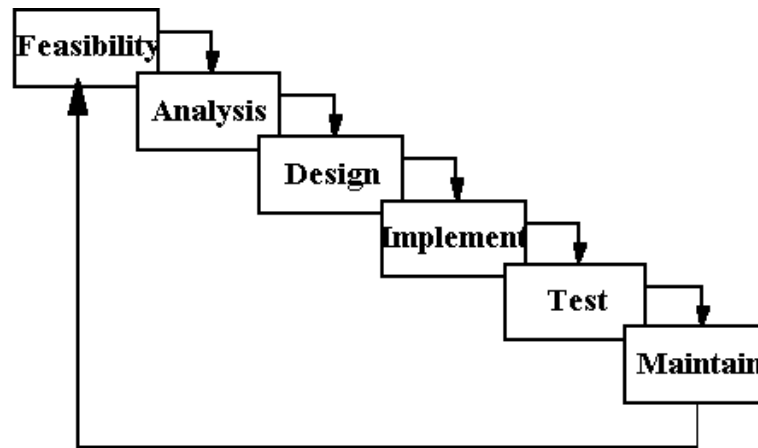


Figure 2.1: the Conventional Systems Development model

The diagram shows that there are a number of stages, each of which must be finished before the next stage is started, although this is not definitive, as it is possible to adapt the model into an iterative version, where it is possible to return to earlier stages before advancing. The feasibility stage details the time plan and budget to determine whether the project should get the go ahead. Although, within this project such a stage would not be necessary –the feasibility stage can also be positioned further along the waterfall (between the analysis and design sections) and be used to assess the feasibility of proposed solutions. The analysis refers to the current processes and the business environment in which a new system would exist. The remaining stages are all self explanatory. Avison and Fitzgerald [3] also highlight possible criticisms of the conventional approach such as the design might not meet the management needs and user dissatisfaction. There are possible criticisms of this methodology; unambitious systems design, which results in a lack of radical changes that may be beneficial, tendencies not to involve the end user and it can be problematic to implement requirements identified further down the waterfall.

### 2.3.2. ETHICS

Another methodology is ETHICS or Effective Technical and Human Implementation of Computer-based Systems. This is a Socio-Technical methodology and is based on a participative approach with heavy end user involvement. Within ETHICS, Enid Mumford [5] defines fifteen steps that are generally human related and the technology does not feature until the later steps:

1. Why change?
2. System boundaries.
3. Description of current system.
4. Definition of key objectives.

5. Definition of key tasks.
6. Key information needs.
7. Diagnosis of efficiency needs.
8. Diagnosis of job satisfaction needs.
9. Future analysis
10. Specifying and weighting efficiency and job satisfaction needs and objectives.
11. The organizational design of the new system.
12. Technical options.
13. The preparation of a detailed work design.
14. Implementation.
15. Evaluation.

The main strands in ETHICS focus on job satisfaction and efficiency needs. The development is largely a change process, which means, as already stated, end user participation is vital.

#### **2.3.3. Soft Systems Methodology (SSM)**

A further methodology is SSM or Soft System Methodology as defined by Peter Checkland [6]. The basis of SSM approach is that it is a tool for thinking about the world in terms of human activity systems. It is a social process rather than a technical one and it relates to change where multiple interests are represented [6]. Within SSM there are seven defined stages that are used to initially understand the problem; it then goes on to define any current systems. To do this rich pictures and CATWOE analysis are used. This technique highlights the people involvement, the communication channels (or lack of) and any conflicts that exist. The next step is to create conceptual models, compare them with reality and then study their feasibility. The diagrammatic nature of SSM tools are very useful to present to non technical stakeholders.

#### **2.3.4. Prototyping**

A slightly different methodology that has been researched is the Prototyping Methodology [7]. This argues that the conventional method is too rigid and if faults are encountered at a later stage then it may not be possible to return to a previous stage to correct them (due to time and cost elements). It is claimed that Prototyping can reduce development costs, decrease communication problems, cut project length and produce the right system first time. This methodology works on the basis of constant communication and regular exercising of the prototype. This means that each stage is done in almost parallel thus being able to re-iterate previous stages. Clear differences can be seen when comparing the model below with the conventional model:

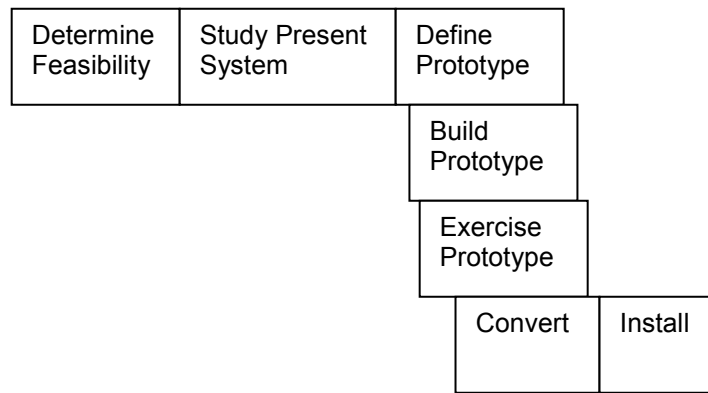


Figure 2.2: the Prototyping Development model as shown in [7]

The possible disadvantages of prototyping are that considerable co-operation and co-working is required from the end user – which for this project creates a problem due to the end user being based in Huddersfield and myself in Leeds and also due to other commitments.

#### 2.3.5. Multiview

A final methodology I have looked into is Multiview. This methodology attempts to combine the soft approach of Mumfords ETHICS and Checklands SSM with the hard approach in order to create a full systems development methodology. Any choice of methodology permutation is allowed and is usually different dependant upon which project you look at.

### 2.4. Chosen Methodology

I feel the most appropriate methodology for this project is a combination of the Waterfall Model with the Prototyping methodology. In order to combat the disadvantages associated with the conventional methodology I shall adopt several features and tools that are used in other soft approach methodologies. Particularly, the features I shall incorporate will be the inclusion of the end user in several stages as with ETHICS, in addition to the use of rich pictures. Further to this I shall use prototyping features such as concurrent testing and building of a prototype as a full system may not be realistically possible in the time frame.

This joint use of these methodologies will allow me to gain the advantages from the clearly defined stages of the conventional methodology such as easy to manage and advantageous for the provision of documentation, with the time and cost benefits associated with prototyping. Additionally, features of the user centred ethnographic approach of the ETHICS methodology and the diagrammatical approach of the Soft Systems Methodology will be used.

### **3. Requirements Analysis**

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#### **3.1. Business Analysis Tools and Techniques**

Ethnography can be defined as “a method of observing human interactions in social settings and activities” [8] and although originally just an observation method, it has become a popular method for analyzing both human computer interaction and business processes. To allow for complete requirements analysis ethnography is very useful. For this project it is most likely that the Quick and Dirty Method of ethnography will be of most use. This method is useful for increasing awareness of usability and acceptability issues that are important in the design of a new system. It is best practiced when there are constraints such as imposing time and/or resource restrictions. According to Hughes et al [9], the quick and dirty method has the advantage of being capable of “yielding valuable knowledge of the social organization within a work setting in a short amount of time relative to the size of the project”. Although, because of its speed, the results it produces are limited to a general understanding of a work culture. Other techniques such as SQIRO combined with prior knowledge; rich picture drawing and some UML will complete the analysis detailing all aspects of the problem environment.

##### **3.1.1. Sampling**

If a system is very intensive on the use of documents it can be advantageous to use sampling to discover the exact data each document holds and also how the document is laid out. This allows you to develop your own versions of a specific document using the good aspects and improving on any failings the document has.

##### **3.1.2. Questionnaires**

These can be very useful tools – if they are used properly. Writing questionnaires is a discipline in itself and therefore they are very hard to create. Also, to be able to perform in depth statistical analysis it is necessary to collect a large number of completed questionnaires, which is very difficult. Due to these reasons questionnaires will not be used in the analysis section.

##### **3.1.3. Interviews**

Interviews are a useful tool as they involve direct interaction with the end users. They can take the form of structured (a set list of questions), semi-structured (a set list but deviance is allowed if clarification of an answer is needed) and unstructured or open interviews (these are more like a ‘discussion’). Interviews are a good alternative to questionnaires.

#### **3.1.4. Research**

This is a must for all projects unless you are an expert on the project/business area. Due to over three years employment with Kirklees Active Leisure it was felt that a solid knowledge of the business environment and processes was already held therefore only limited further research was required within the requirements analysis.

#### **3.1.5. Observation**

By watching people in their own environment it is possible that the functionality of their jobs will be uncovered, which may include functions that may not generally be brought out during an interview. It is also noted that people are not good at estimating the times it takes them to complete certain tasks, therefore observation gets exact results.

### **3.2. The Organisation**

Kirklees Active Leisure or KAL are the leisure services providers for the Kirklees district. There are many KAL sites throughout the district and I am specifically working with The Stadium Leisure Complex. The organisation consists of several layers of management; the area manager, the site manager and several duty managers. In addition to five full time reception staff, approximately fifteen lifeguards who also have brief knowledge of reception so they can provide cover if needed, six full time swimming teachers and approximately five stand in teachers who are used when the original teachers are unavailable.

### **3.3. The Current Enrolment Processes/Environment**

The site offers swimming lessons for children under the age of six (includes parental participation) and swimming grades one to five for the children aged six and above. The lessons for the younger children (i.e. under six years old) are run in classes with a maximum capacity of ten swimmers per class and the grades are run in classes with a maximum capacity of twelve per class. The children's classes run on a thirteen weekly cycle which comprises of twelve lessons – the extra week being used for either pool maintenance or as a 'catch up' if any previous lessons have been missed or as an extra chance to gain a badge and certificate.

The enrolment procedure for the lessons starts on week ten of the thirteen week cycle thus giving sufficient time for the large amounts of administration. The first step is for the swimming teachers to indicate who has passed the grade and who has failed. The children who pass the grade are then required to move to the next grade and are classed as MOVING customers. The children who



have failed the grade need to stay in the same grade and are classed as STAYING customers. Each child is given a slip informing them whether they are moving or staying. These notes then need to be posted into the relevant moving or staying letterbox located at reception – this indicates that the person wants to carry on participating in the lessons. A receptionist then completes all the administration work for the staying customers and they have until a certain date to pay thus securing their place. The moving customers prove somewhat more problematic. To process the moving customers Gemma Ripley (Duty manager and swimming co-ordinator) has to sift through them using some logic (and occasionally some “unfair” business etiquette i.e. friends first) to place them correctly. This is due to trying to satisfy customer needs i.e. if a parent has three children they will not want to have to come to the leisure centre three times, they will simply want the lessons as close to each other as possible. Once the places have been allocated a receptionist is required to complete the administration and then, as with the staying customers, the moving customers have until a certain date to pay and secure their place. If any payment deadlines are missed the customers name is withdrawn from the class and the place is made vacant.

Once the existing customers (i.e. the staying and moving customers) have been accommodated and once the moving customers’ payment deadline has past, any vacant places are made available to customers from other KAL sites (on proof of grade eligibility). Other sites customers only have one day’s priority until any remaining places are made available to new customers (the general public). This is done on a first come first served basis and unless a customer is starting in the bottom grade they must have a pool assessment done by one of the qualified teachers. This ensures that all customers enter the correct grade.

Exceptions to the above process occur when a staying customer requests to change their lesson time and/or their teacher. When this happens the customer simply changes from being a staying customer and becomes a moving customer. Another exception, which occurs regularly when the enrolment is in the summer months, is when families are going on holiday and therefore cannot be present to pay before the relevant deadline date. The current solution to this is for the customer to provide proof that they are on holiday abroad (holidays in Great Britain are excluded from this exception as it is possible for customers to pay over the phone) in the form of either their tickets and/or a travel agents letter. Once this has been determined they are permitted to leave a cheque or agree on an extended payment deadline with the manager.

The above processes can be further complicated as when a child passes a grade they are entitled to purchase the relevant badges and certificates. Due to most children passing the grades on their final lessons of the cycle i.e. week twelve, there is a mass rush of customers trying to purchase certificates and badges. The process of finding and printing a certificate is not too time-consuming, but it does create a problem for reception, therefore a system where the customer completes a form (which is authorised by a swimming teacher and is written by the customer to combat any spelling mistakes) and returns it to reception along with the payment has been introduced. The certificates are then collected – once signed by the teachers - at a later date by the customer.

Once the swimming lessons start a new cycle the swimming teachers do not allow any additions to their classes. This allows a duty manager to tally up totals of the number of Kirklees passport discounts given, the amounts taken per day/per grade etc and provide the management team with some ‘performance’ statistics such as gross profit and the percentage of the capacity of each class.

### **3.4. Process Identification**

Through interviews with staff, observation and obtaining sample documents it was possible to identify that there were many processes involved within the problem situation. I have identified a range of processes which I have split into four sections; each process can be seen in detail in Appendix C:

#### **Enrolment**

- Classifying current customers.
- Creation of lesson slips.
- Distribution of the slips.
- Returning of the staying slips.
- Staying customer payments.
- Returning of moving slips.
- Enrolling moving customers.
- Moving customer’s payments.
- Enrolling other sites customers.
- Pool tests.
- New customer enrolment.

#### **Administration**

- Creation of badge/certificate slips.

- Recording of certificates to be printed.
- Storing teacher details.
- Storing customer contact details.
- Creation of Registers.

#### **Finance/Management**

- Creation of statistics sheets (1) - income and profit per day, split into each lesson.
- Creation of statistics sheets (2) - income and profit per week, split into each day.
- Teacher statistics.
- Create new lessons.

#### **Physical**

- The pool tests.

### **3.5. Business Rules and Assumptions**

The business rules and assumptions associated with the enrolment processes are as follows:

1. The available grades are...
  - a. Water confidence - available to children under the age of six. The lessons require a parent or guardian to be in the water with the child.
  - b. Grades 1, 2, 3, 4 & 5 – available to children aged six or above (if a child is five but they have their sixth birthday during the thirteen week lesson cycle, they are eligible). The exceptions to this rule are if a teacher authorises a capable child to move up from water confidence to grade one irrelevant of their age.
2. Any new customers entering above grade one must have proof of their capability when enrolling...
  - a. Other sites customers must have a document authorised by a teacher at the site they previously attended.
  - b. New customers must have their copy of the pool assessment form which must show no signs of tampering and must be authorised by a teacher that works at the Stadium Complex.
3. Anyone who will miss a payment deadline due to a valid reason (the validity determined by the duty manager) must agree the course of action with the duty manager.
  - a. Holidays - the holiday must be abroad (due to the possibility of paying over the phone if the person is still in the UK) and proof of the holiday must be shown (i.e. tickets or a travel agents verification).

- b. Nominated person - if the customer is unavailable but a nominated person is willing to make the payment then this is the preferred choice of action.
  - c. Cheques – it is possible to leave a cheque at reception ensuring that all necessary details are deposited with it i.e. child name, grade number, class day and teacher, along with a contact number.
- 4. Due to health and safety regulations a ratio of 1:12 (teacher:swimmer) must be adhered to for the grades one to five and for the water confidence classes a stricter ratio of 1:10 is applied.
- 5. Each swimmer is only permitted to enrol into one class for each thirteen week cycle.

### **3.6. Documents**

When dealing with a paper based system it is evident that many documents will exist. Therefore through interviews with duty managers and receptionists (i.e. the employees who have most interaction with these documents) it was possible to identify a full list of all documents used, along with their purposes and who is involved with them. To gain a true picture of these documents and to identify the exact data held on them, some samples were taken. The documents identified were:

- Current lesson registers
- Staying slips
- Moving slips
- Booking sheets
- Payment receipts
- Proof of holidays
- Reserve lists
- Proof of grade documents
- Pool assessment forms
- Badge/Certificate authorization slips
- Certificates
- Certificate book
- New Registers

A complete table, detailing the outline and the data content of each document can be found in the Appendix D.

### 3.7. Stakeholders

Below is a list of the people who have a stake in the enrolment procedures -some links are direct i.e. staff who process the enrolment documents and some links are indirect i.e. QUEST the quality award company who recognise quality within the leisure service sector.

#### 3.7.1. Individuals

- *Teachers* – are directly linked into the processes. They are required to produce the initial input in the form of the indicating the staying and moving customers. They also receive an output of the whole procedure in the form of the new registers. There are six full time teachers and a further four or five casual teachers who can be called upon in emergencies.
- *Receptionists* - are vital to the current system due to the large amount of paperwork and admin they have to carry out. Their high level of involvement means that mistakes are often made such as not recording receipt numbers and not keeping work tidy (i.e. the booking sheets) which make it very difficult for other members of staff to use. The receptionists are the key interface to the customers; they interact with them, take payments and deal with inquiries and complaints. There are three full time receptionists, four part time and several other casual non-contracted receptionists, all whom, at some point, will have a part play in the enrolment.
- *Duty Managers* – are also vital to the current way of working as they are the main authority and are the people who deal with the processing in the form of actually enrolling people into classes. In addition to making everything occur when it should and ensuring that everything runs smoothly they have to report to higher management. To do so they are required to produce the balance sheets with the financial and statistical details. There are three duty managers and two head attendants who ‘act up’ as duty managers from time to time. Gemma Ripley is one of the duty managers and she is the main point of contact and main authority within the swimming lessons.
- *Senior management* – are primarily interested in the financial aspect of the whole system. They are interested in the profits being made or lost and also the potential for improvements. They rely on the junior staff to organise the swimming lessons. Senior management consists of several layers of people playing different roles within the establishment, such as Barry Turnbull - Operations Manager, Martin Mosey - Swimming Development Manager and Ian Kendall - Head of Leisure services.

### 3.7.2. Groups

- *Customers* – these are split into four groups; moving, staying, other sites and new customers, but they all want the same reliable service. Their involvement is limited to the input of their moving and staying slips, payment for the lessons, purchasing badges and certificates and also exchanging personal details. Additionally, the customers can be split into the parents and the children. The children's stake in the whole process is that they want to get their first choice class so they are with a teacher they know/like and so that they are with their friends. They also want to get their rewards such as the badges and certificates as soon as they can.

### 3.7.3. Organisations

- *KAL (Kirklees Active Leisure)* – The organisation as a whole are the main stake holders, they need efficient processes to attract and satisfy customers, as this brings in the revenue. They also need to meet the criteria set by external bodies in order to gain recognition for the level of their services.
- *ASA (Amateur Swimming Association)* – the stake that the ASA have is that they want as much involvement in swimming as possible. This will then enhance the chances of continued participation which may eventually lead to creating competitive swimmers which is the ASA's primary objective. Further more, they are the body who set the syllabus for the Water confidence lessons and who produce the badges and certificates. This means they will want an efficient and effective system for enrolling and for management of the lessons, certificates and badges in order to create good demand which may lead to increased revenue.
- *QUEST* – this is an organisation who aims to assess and recognise high standards within the sport and leisure services. QUEST identifies twenty areas within the business that are assessed and graded. The grades are published therefore it is a priority of KAL to achieve a high score in QUEST grading as it can affect customer levels in a significant way (positively or negatively). Of the twenty areas assessed there are several that relate to the use of technology, administrative processes and continuous improvement.

### **3.8. Soft Systems Analysis**

#### **3.8.1. Use Case**

A use case diagram was developed (Appendix E) during a joint workshop with a duty manager in order to identify the requirements for each of the main stakeholders who have a direct relationship with the current system.

#### **3.8.2. Rich Picture Explanation**

A rich picture was drawn to ensure the business environment was fully understood – the diagrammatic nature allows non technical people to understand it, this can be found in Appendix F. The picture shows that the swimming teachers return the completed registers to reception to indicate who is staying or moving. A receptionist will then supply the teacher with the moving slips to hand out to the swimmers. The staying swimmers then have to pay (by a certain date) and the moving swimmers have to post their preferences into a box at reception. The duty manager then sorts the moving swimmers and adds them to the lessons. The moving customers are then required to pay (by a certain date). As swimmers pay, the receptionist adds them to the booking sheets. Once the moving swimmers payment deadline has passed, other sites customers followed by new customers can pay. Finally, the receptionist has to create the new registers and the duty manager has to create statistical documents which are presented to senior management.

The rich picture was drawn as a validation and verification tool to ensure that a full and correct understanding of the business environment, the processes and people involvement. This was achieved as it was possible to show the Duty Manager thus ensuring the situation and environment were correctly understood.

### **3.9. Non-Functional Requirements**

The complexity of Information Systems is commonly determined by their functionality but in part it should also be determined by its global requirements or non-functional requirements. Mylopoulos et al state [10] “...non-functional requirements play a crucial role during systems development, serving as selection criteria for choosing among myriads of decisions”. This illustrates the importance of non functional requirements. In addition to this Bredemeyer and Malan [11] state “A system has properties that emerge from the combination of its parts, these emergent properties will surely be a matter of accident, not design, if the non-functional requirements, or system qualities, are not specified in advance”. A common theme appears to be

that non-functional requirements have been, and still are, often over looked but yet are so important.

Due to vast number of non-functional requirements possible, it may be better to group them under certain headings:

Non-Functional Requirement Categories	
Who?	Security Requirements
Where?	Topographical Requirements
When?	Timing Requirements
How Many?	Scalability Requirements
How Often?	Frequency Requirements
How Fast?	Performance Requirements
How Easy?	Usability Requirements

Figure 3.1: taken from How Fast is Fast? Using Non-Functional Requirements to Test Requirement Quality [12].

Security Requirements – the system will not hold any truly sensitive data (the most sensitive data being phone number and address) so maximum security is not needed, although some form of security will be needed.

Performance and Usability requirements – these two requirements go hand in hand - during busy enrolments it is possible for approximately 60-80 people to be queuing and currently only a maximum of 25-30 people can be processed in an hour therefore it is of prime concern that the performance and usability be maximized in order to cut through flow speed. Usability, along with other non functional requirements is covered in greater detail in chapter 5 (Design).

### 3.10. Conclusion

It is clear that there are many problems involving many stakeholders within this business environment. These have been identified through a series of interviews, use of sampling documents and thorough observation and research. By identifying these problems it is now known what features and functions a potential solution would require.



## 4. Feasibility and Recommendation

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### 4.1. Feasibility Techniques

It is a common thought across a number of publications that the feasibility section of a project is integral to the success of any implementation. The purpose of feasibility reports is essentially to determine whether or not to implement plan X [13]. In the majority of cases the most important aspect of a feasibility study is the economic viability, although it is not as important in this project due to a lack of budget there is no risk of any loss. Other functions of feasibility reports include “presenting the risks and returns associated with the project in a manner that permits the prospective members to evaluate them” [14]. In the case of this project the prospective members include myself, Gemma Ripley (Duty manager) and Richard Marshall (my primary correspondent for the staff). It is important to note that there is no distinctive ‘yes, lets implement’ point, it is down to a group decision. Although the economic viability and the risks are highly important, other issues that MUST be considered are detailed by the acronym TELOS . TELOS stands for:

- Technical
  - Can existing technology be used or is new technology involved?
  - Is the necessary expertise and infrastructure available?
  - Will a solution be able to meet initial performance expectations?
  - Will a solution be able to accommodate expected new use and functionality over the ‘medium term’?
- Economic – will the costs outweigh the investment – where costs include development, purchase, construction (cost of developers’ time, software, employee time for user centred development), installation, training, maintenance, repair, running costs
- Legal
  - Are there legal responsibilities?
  - Liabilities?
  - Governing bodies to satisfy?
- Operational – would the system actually address or solve the business problems? The following should be considered:
  - Organisational culture
  - Staff resistance or receptivity to change
  - Management support for the new system
  - Direct and indirect impacts of the new system on work practices
- Schedule – will the system be built in time to realize the benefits and meet constraints?

This ensures that the whole environment has been considered and ensures that any conclusions of the report are genuine and realistic.

After consulting a variety of feasibility documents [13, 14, 15] it was possible to identify the main criteria that should be contained in such a report. The headings are:

- Executive summary – this tends to be the only section certain end users look at, which emphasises its importance.
- Project description.
- Development of problem situation.
- Project Specification.
- Existing Solutions.
- Potential Solutions.
- Chosen Solution.
- Other Issues to be considered.
- Conclusion.

The above should determine the answers to the five W's, (What, Where, Why, hoW, When). The questions being along the lines of; what resources are needed? Why do they want this? How will it be accomplished? When will it be completed? These questions have to be asked as it is necessary to know what you are doing now in order to identify any problem areas thus emphasising the areas which are high priority when it comes to the need for improvement. Once it is known what needs improving it is possible to suggest potential solutions which are then tested for feasibility via the TELOS structure.

The full feasibility study, written to the above layout can be seen in Appendix G. It highlights the main problems as lack of storage space due to the recent merger, documents getting lost and/or misplaced, work is unprofessional and at times is unreadable, everything to do with the system is inefficient, administration errors are frequent and the system for selling and processing badges and certificates is poor. The report proceeds to examine the processes and documents as examined in chapter 3 to determine the minor problems that are most likely forming the primary problems.

#### 4.2. Assessment of Requirements

The following is a high level specification of criteria (matched with the current processes, which can be seen in appendix C) which if met would be considered as representing a solution to the problem:

Requirement ID	Requirement Description  The system must...	Related Current Processes
Req01	Allow for staff to indicate the status of current customers (i.e. moving or staying) and the ability to change a customer's status.	E1
Req02	Be able to inform customers of their status (indirectly)	E2 & E3
Req03	Be able to register when a customer confirms their interest and process customers into the relevant classes, preferably in accordance to their preferences.	E4, E6 & E7
Req04	Be able to indicate whether a payment has been received and ensure that the receipt number has been stored.	E5 & E8
Req05	Be able to deal with exceptions in regards to payment deadlines.	E5 & E8
Req06	Be able to delete non-paying customers.	E5 & E8
Req07	Be able to add new customers	E9 & E11
Req08	Be able to enrol new customers ensuring the business rules are adhered to.	E9 & E11
Req09	Be able to process documents i.e. pool assessment forms, badge/certificate slips etc.	E10, A1, A2, A5
Req10	Be able to create new lessons	FM5
Req11	Be able to store reserves (a reserve list)	E4, E6 & E7
Req12	Be able to store staff details	A3
Req13	Be able to create financial balance sheets	FM3
Req14	Be able to create statistical figures to aid management decisions	FM1, FM2, FM3 & FM4

The above table was cross referenced with the identified process problems hence ascertaining exactly where the problems were, which identified where improvements were needed.

#### 4.3. Existing Solution – Pool IT

This is an off the shelf product [16] which is created by a collaboration of Leisure IT Services Ltd and AAS – a software development company. The system has been around for several years and was originally created for Bollington Leisure Centre in 1990. Since then, the system has evolved through a number of different versions up to today's Pool IT v4.0. The system was originally a program based system built in dBase IV and featured relational tables of pupils and courses. The evolved versions then made the use of Visual Fox Pro and also Windows based data systems.

In correlation to the evolution of the system additional functionality has been added so that it is now capable of:

- Personalized letters.
- Syllabus recognition (provided by the ASA) i.e. each class has an associated grade and each grade has a set syllabus, Pool IT assigns parts of the syllabus to each lesson. Teachers are required to edit the syllabus when and where necessary.
- Creation of registers.
- Automatic allocation of pupils, which management could intervene to deal with exceptions.
- Pool zones i.e. if a class at 10:00 Saturday uses the shallow end then it will ensure no other class uses or is booked for this zone.
- Badge Stock recording.
- Crash course management i.e. for school holidays etc.

Pool IT have highlighted that in the near future they are planning on implementing some functionality that will allow for the use of Personal Digital Assistants by swimming teachers. This will allow for registers and other relevant details to be uploaded onto a teachers' PDA which they will then have on the poolside when conducting the lessons, thus enabling the teachers to complete registers on their PDA's and then upload the details onto a desktop with the Pool IT system installed. This reduces the manual work needed currently.

#### **4.3.1. Requirements**

A PC running Windows 95 or better and 128Mb RAM is sufficient for Pool IT. The whole program and library files occupy less than 7 MB. Previous sites which have used the system have been known to host a system which has 2000+ current pupils on 200+ courses with a 12 year history involving over 45000 records in less than 20 Mb.

#### **4.3.2. It's Claimed Advantages**

Below are Pool IT's claimed advantages taken directly from its website [16]:

- "It saves staff time and retains customers."
- "Users of Pool IT find that the pro-active nature of its approach promotes customer retention, and greatly improves cash flow."
- "Pool IT saves vast amounts of staff time. Its auto-allocation of pupils to courses can handle 1800 names and allocate them onto 190 courses in about 4 seconds."

#### 4.3.3. Problems

Kirklees Active Leisure have trialled this software at the Stadium Business and Leisure complex and were not impressed by the system – although due to the constant ongoing development of the system the latest version is considerably different to the version trialled. The management stated that the problems were as follows:

- *Too much swimming teacher involvement* - the system requires teachers to update the registers as soon as the lesson is complete or very soon after. At the Stadium Leisure centre this is not possible due to computer availability and teachers time (on Saturdays they teach 08:00 – 17:30 with a brief lunch break therefore they do not have time to input all the register details).
- *Acceptance from teachers* – on a slightly different note to the point mentioned above the teachers and certain other staff at the stadium are from IT illiterate backgrounds and therefore did not welcome the dramatic change to their working ways, especially through the use of IT. Therefore the system was not used correctly and this meant that the system benefits could not be taken advantage of.
- *Generic Nature of the System* – during an interview the duty manager informed me that the Pool IT system is an attractive and functional system but the problem is that it is generic and attempts to meet the requirements of *all* swimming pools or leisure centres. In order to be generic the system is developed in accordance with the ASA and the specific syllabus they set. In Kirklees the ASA syllabus is not followed for grades one to five. A new syllabus devised by the Swimming Development Officer within Kirklees Active Leisure is followed and also the business processes are different to those that the Pool IT system expects to be followed. An example is that moving swimmers get a choice of class and are not simply allocated to the next grade.
- *Cost* – the system is quite expensive costing £1500 for the software and the installation. Servicing or maintenance costs are also high. Also, if the newer system incorporates the use of PDA's they will have to be purchased. A standard Dell handheld costs in the region of £150 [17] and at any one time it is possible for a maximum of three teachers to be teaching therefore three will be required costing approximately £450.
- The automatic allocation of swimmers to lessons did not use any customer logic i.e. dealing with parents who have more than one child first. This created dissatisfied customers and further difficulties arose in the re-allocation to new lessons (if possible). This was a problem because customer satisfaction is high on the leisure centres list of priorities.

Due to the failings of this software primarily being down to usability issues, usability and acceptance were researched in order to identify what aspects make a system ‘friendly’ and usable, which in turn will increase the probability of user acceptance. The findings of this research are discussed in Chapter 5.

Through correspondence with the Amateur Swimming Association it was highlighted that Pool IT sits in a monopolistic market with them being the only commercial swimming lessons management software providers available. Therefore the other options were to create a new system using available generic software or creating the software from scratch.

#### **4.4. Potential Solutions**

A TELOS analysis of each potential solution can be found in Appendix H. The following is an overview of the key points in relation to each.

##### **4.4.1. Microsoft Access Database**

MS Access is a Windows based database system. It is easy to use and has powerful design tools which make developing code relatively easy and fast, hence it being cheap. MS Access allows the user to store, create, process and manipulate data in many ways. It is possible to write queries, create interfaces and forms, develop reports and use data integrity checks such as input masks and mandatory fields. If required, additional functionality can be added to MS Access databases via Visual Basics programming. This solution would also allow for combining spreadsheets with the database. This would add the extra functionality that spreadsheets have. The hardware requirements of MS Access are very basic and are determined by the data held within the software itself. A system built using MS Access will most likely run on any desktop PC and/or laptop.

##### **4.4.2. Web-based Database**

This involves the creation of a website and an underlying database. A solution of this kind will most likely make use of mySQL to create the database and ASP to link it to the website. This method has the advantages of being able to share the database amongst users via the web. It can also allow users to submit information/data to the database from the comfort of their own home. The disadvantages are that acquiring web space costs money, security is an issue and putting a database on the web is not always necessary. Such a solution would require a central server that would need to be connected to the internet at all times in order for the database to be online.

#### **4.4.3. Microsoft SQL Server Database**

This is a database platform that provides data management capabilities along with additional business tools. It provides secure, reliable storage for relational and structured data, enabling you to build and manage data applications. Microsoft SQL server databases also support storage and query of XML documents which aids dissemination of data between different applications over local networks and the Internet. The retail price for Microsoft SQL Server 2005 Developer Edition is \$49.95 [18] and a licence is required.

#### **4.4.4. Swipe Card Integrated Database**

To allow for the possibility of meeting a further requirement and due to the management requesting research into a swipe card integration solution the following was discovered. The Stadium Leisure Complex the Health Club currently use an MRMplus2 membership management system which is supplied by a company called Gladstones [19], although other systems are available I have researched specifically Gladstones due to the Stadium Complex's current dealings with this company. This incorporates a database with swipe card integration. The system would operate on a client-server basis with all the clients connecting via a citrix server to the central SQL database. MRM.plus2 operates as a complete application of its own. There are two options for the database with a solution of this kind; an SQL based database or a Microsoft Access database, although a MS Access solution would require an extra module to be installed, namely MRM.datamine. Once the system is set up, i.e. hardware and software installed and also all current customers details added, efficiency would increase considerably in the way that customer details will be called upon via a swipe card rather than searching through the records. MRM.plus2 licences can be purchased on PC by PC basis and currently cost £1500per PC with a £280 annual service charge. An MRM.plus2 solution is not a dedicated solution for swimming lesson management, although its modules allow for this capability e.g. point of sale, bookings, cashless, direct debit, etc.

The costs of an MRMplus2 system are as follows:

- Swipe card readers (purchased directly from Gladstone) that read barcodes on the reverse of the membership cards - priced at £210 per reader – although it may be possible to use the health clubs reader. If this solution was to be pursued this should be proposed.
- Swipe cards which allow for corporate branding on both sides of the card and individually numbered so as not to conflict with any other cards are charged at £0.28 per card when you purchase 10,000 cards at once, costing £2,800.

#### **4.5. Other Issues**

On a wider view of the situation ethical issues, safety issues and legal issues must be considered, below is a summary of each:

- *Ethical Issues* – Only authorised staff should be permitted to view sensitive details such as the recording of any disabilities.
- *Safety Issues* – not relevant to this project as I will be utilizing the current available hardware which should be set up in an ergonomically friendly environment.
- *Legal Issues* – such legislation as the Data Protection Act 1998 which outlines several principles that must be adhered to. They are:
  1. Personal data shall be processed fairly and lawfully.
  2. Personal data shall be obtained only for one or more specified and lawful purposes and not be used in any other way.
  3. Personal data shall be adequate, relevant and not excessive.
  4. Personal data shall be accurate and kept up to date.
  5. Personal data processed shall not be kept for longer than is necessary.
  6. Personal data shall be protected against unauthorised processing and accidental loss, destruction of and damage to.

#### **4.6. Chosen Solution**

After thoroughly considering the above options taking into account the functionalities that each would offer, how it would meet the requirements, the technical capabilities of the users and also the cost of each solution it has been decided that a solution shall be implemented using a Microsoft Access Database with the optional use of spreadsheet modules. This will allow the stated problems to be solved, the requirements to be met and should also be accepted by the users due to the user's technical capabilities.

The TELOS evaluation also proves this choice to be wise indicating it will be feasible in all five areas. The main areas of this evaluation that swayed the choice were its organisation feasibility – as this is where PoolIT failed. A Microsoft Access solution would allow for user acceptance and maintainability, which was the duty managers primary concern.



## 5. Design

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### 5.1. Introduction

The design phase of any database project is an essential and a very important phase of the project. It highlights the tasks that are required and helps reduce the time and effort needed in the implementation phase. Elmasri and Navathe [20] identify five phases that should be present in the design of databases:

1. Requirements collection and analysis – see previous chapters.
2. Conceptual database design
3. Choice of DBMS – see feasibility study.
4. Data model mapping or Logical database design
5. Physical design

For this project phase 1 as shown above has been carried out and documented in a separate chapter. Also the choice of DBMS for this project has been thoroughly investigated in the feasibility chapter.

### 5.2. Conceptual Database Design

This phase aims to provide a model of information that is independent of all physical considerations. It can provide both end users and database developers with invaluable information on the future database. It aims to give a full understanding of the semantics of the database which includes the structure, the entities, the relationships (including relationship types) and the constraints of any potential system. This design should be done from a high level and should simply lay down the fundamental outline of the database. Although it was possible to include the end user in this conceptual design, it was decided – by both the end user and myself – that, due to the end users lack of knowledge, this would most likely hinder the design and make it very costly in terms of both effort and time. Therefore, this design phase was primarily completed by myself. Brief consultation with the end user did occur. Additionally, it provided the initial introduction to the future system – even though from a high level, it allowed the end users to see the general outline of the system. The product of this phase is an Entity-Relationship diagram which is a simple yet powerful graphical technique, which can prove to be good tool in database design [21]. The diagrammatic nature of the E-R diagram (see Appendix I) also helped a great deal in portraying the system to the end user.

### 5.3. Logical Database Design

This is an advancement from the above stage and it takes the design a step further by considering keys (primary and foreign), functional dependencies, normalization and constraint checks.

### 5.4. Physical Design

This phase is where the conceptual and logical design are brought together and actually implemented into a DBMS, response time, space utilization and transaction throughput should be carefully considered, as to maximise the databases performance. This can be done via various types of indexing, record clustering; input masks, validation rules, field size limiting and mandatory fields (refer to data dictionary in Appendix J)

### 5.5. Keys

It is necessary for each relation within a scheme to have a primary key. This is an attribute that acts as a unique identifier and is vital following the normalization process. Primary keys can be existing attributes (as long as they are unique identifiers) or can be new attributes with the sole purpose of being the unique identifier. Other types of keys include foreign keys, which are primary keys from a different table. Foreign keys resolve relationships and support navigation among tables.

### 5.6. Functional Dependencies

This is central to the understanding of normal forms and can be defined as a constraint between two sets of attributes [22]. Put simply, functional dependency means that given  $X$ , you can determine  $Y1, \dots Yn$ . This can be written as  $Y1 \dots Yn \rightarrow X$ .

### 5.7. Normalization

As mentioned above normalization uses functional dependencies. It concentrates on decomposing schemes so that each functional dependency (FD) is separately identified. See the example below:

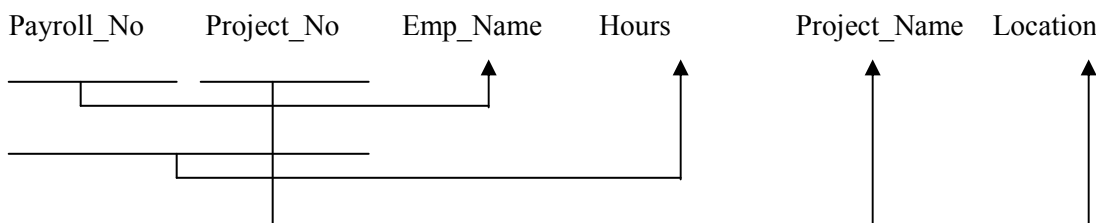


Figure 4: taken from [23]

FD1 – if you know a persons' Payroll\_no, you can determine their name.

FD2 – if you know a Project\_No, you can determine details such as project name and location.

FD3 – if you know both Payroll\_No and Project\_No, you can determine the number of hours a person has worked on a project.

It is best practice to normalize to a degree of either BCNF (Boyce-Codd Normal Form) or 3NF (Third Normal form). Third normal form is where the primary key determines every attribute within the scheme and there are no sub-functional dependencies within the same scheme i.e. everything within the scheme can only be determined by the primary key and no other attributes within the scheme. The normalized schemas can be seen in Appendix K.

## **5.8. Constraints**

Constraints exist to ensure the integrity and the performance of the database. Elmasri and Navathe [20] identify several different types of constraint, namely;

- Entity Integrity constraints – this states that all primary keys must not be null, as they are the unique identifiers for a record and they must be present.
- Referential Integrity constraints – this is where there is a relation between two tuples. The constraint states that for the relationship to be present the tuple must be present either side of it i.e. an occurrence in each table. This is where foreign keys help, to ensure that, for example, when a swimmer is deleted from the swimmers table they are also deleted from a specific class.
- Transition constraints – these deal with state changes of records and can include business rules. These constraints can be specified using active rules and validity checks, dependant upon the DBMS in use.

Further constraints, as Identified by Roberts [23] include:

- Domain and Attribute constraints – these can restrict the values an attribute can take e.g. Grade = 1, 2, 3, 4, 5.
- Check constraints – these apply to relations, an example is that DateOfPoolAssessment >= Today.

## **5.9. Usability**

### **5.9.1. Key Issues**

As previously mentioned, the failure of the Pool IT system was largely due to usability issues and acceptance, therefore a significant part of this project was aimed at ensuring the system is accepted and that it is regarded as having high usability. As common sense implies, the issue of

acceptance was investigated before the focus moved to the issue of usability. This is because a user must first accept a system before they can use it. This area of study is important as performance gains can often be, as Davis [24] quotes “obstructed by users willingness to accept and use available systems”.

Davis’ paper [24], hypothesises that perceived ease of use and perceived usefulness are the fundamental determinants of user acceptance. This hypothesis has several theoretical foundations. Schultz and Slevin [25] also identified the perceived usefulness and the perceived ease of use as key determinants of user behaviour; this was later supported by Bandura’s [26] work on human behavioural characteristics and psychology. The conclusions were that perceived ease of use and perceived usefulness affected human behaviour in a significant way. Further supporting studies include the Cost-benefit paradigm [27]. This concluded that subjective and objective decision making and effort were the key determinants for behavioural characteristics, which Davis points out, are closely related to perceived ease of use and perceived usefulness. In addition to these computer-usage related studies which includes a marketing study [28] concerning user perceptions on certain products. This deduces that ease of use and effectiveness are the underlying factors that influence human behaviour.

Due to the high correlation of the conclusions of these studies it can be taken that the original hypothesis is feasible. Davis then proceeded to carry out two studies to test and evaluate the two underlying issues related to user acceptance. His conclusion was that perceived usefulness and functionality are far more important than the perceived ease of use of a system. Although perceived ease of use still featured with user acceptance. A quote taken from the paper that sums up the conclusion is “...users are driven to adopt an application primarily because of the functions it performs for them”.

A follow up paper was written which extended Davis’ conclusion by saying that perceived ease of use is what helps people adopt systems; where as perceived usefulness is what encourages prolonged, high-rate usage.

### **5.9.2. Implications**

The implications of this research indicate that when designing the swimming lesson enrolment and management system, development of the underlying database using ‘user friendly’ concepts as to meet the minimum requirements should initially be the priority. To meet a further

requirement, a ‘friendly system’ with a ‘friendly interface’ was developed thus presenting users with a perception of ease of use. The easiest way to portray the system as being ‘friendly’ is through the interface as the case is often that novice users consider the interface to be the actual system. In addition to a good user interface which allows for high adoption rates from users, there is also substantial evidence that attention to usability dramatically decreases costs and increases productivity [29]. More importantly, to reinforce the ‘friendly system’, attention was focused on ensuring that full functionality was present thus promoting the possibility of prolonged usage. This was done by designing in the previously stated functionality. The link between user acceptance and usability is shown via the diagram below:

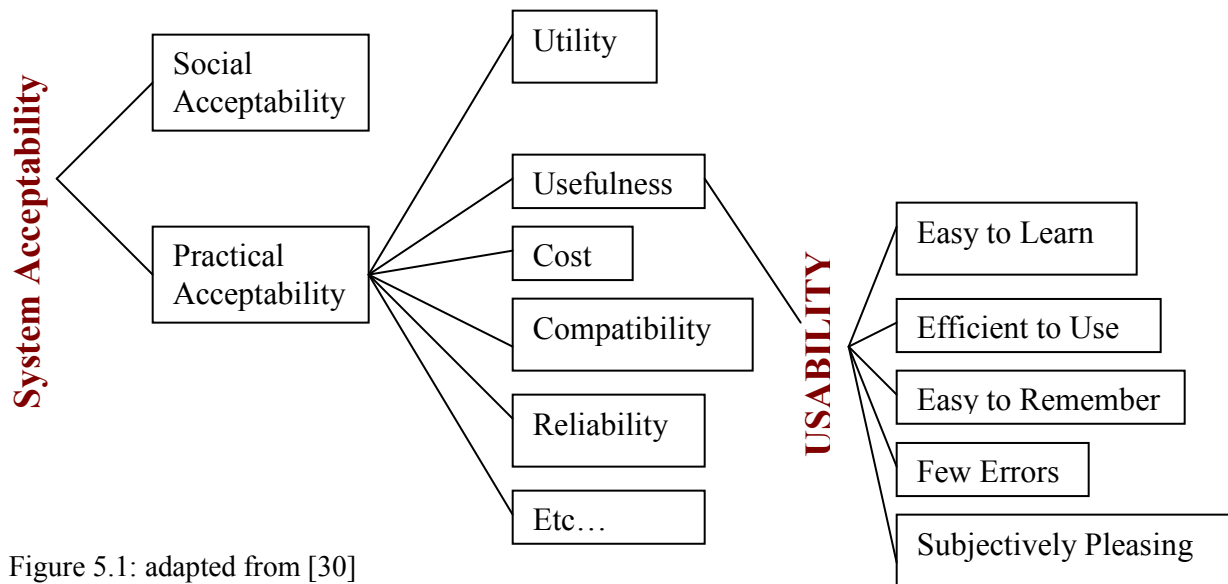


Figure 5.1: adapted from [30]

### 5.10. The Interface

As I have already established, the interface must portray the system as being easy to use, if it does not a dramatic consequence of a poorly designed interface can cause a number of problems. It can result in disrupted operations, wasted time/effort/money on behalf of the staff and the customers and also failure to achieve the potential benefits of automated information handling [31]. Other consequences are that errors may be more frequent and/or serious, there may be longer queues for customers and there may be an increase in complaints from both staff using the system and from customers.

The interface must also meet the general rules outlined by certain regulations such as Directive 90/270 from the Council of European Communities [32], which require interfaces to be “easy to use and adaptable to the operator”, although “easy to use” is not strictly defined by the directive.

### 5.11. Design Principles

When designing interfaces there are a number of general design principles or guidelines that can help designers create attractive and effective interfaces. After reading several books on the topic of human computer interaction I have observed conflicting ideas, mainly due to the difficulty of supplying one definitive set of guidelines and also due to the fact that each book contains guidelines, which by definition is only an 'indication'.

Although each book contains differing guidelines, they all include several fundamental recommendations such as:

- The use of consistency, which Hix & Hartson [33] call “the principle of least astonishment”. The consistency of an interface can refer to a number of attributes i.e. the size, colour, location, wording, function, sequencing etc. When dealing with consistency, simplicity should also be used. This enables the user to become familiar with the interface at a quicker rate and also makes complex tasks possible. Consistency was incorporated into the design by using a standard design template for each form created.
- The use of Feedback – this is responding to user actions e.g. when a user saves a file a message stating ‘Swimmer record has been saved.’ should be displayed or when a user attempts to load an application the cursor turns into an egg timer. The feedback provided should be relevant to the frequency and size of the operation. Any minor frequent operations should receive modest feedback; where as the response to larger infrequent operations should be more substantial. This simply provides closure for the user thus giving them a satisfaction of accomplishment e.g. when a new swimmer is added, the message “New swimmer details have been saved thank you”.
- Error handling – this ensures that serious errors cannot be made thus making the user feel more comfortable. This can be done via several methods such as default values, drop down menu’s, validation rules and making fields mandatory e.g. this would help combat the problem of receptionists forgetting to enter the receipt numbers and also ensuring that the swimming teachers are not double booked for both new swimming lessons and pool assessments. Also to ensure swimmers cannot purchase awards they do not qualify for the awards are linked to each swimmers grade, therefore, if a swimmer is only in grade 2 they can only buy grade 1 or grade 2 awards.

Shneiderman [34] and Hix & Hartson [33] detail other guidelines, where as Sutcliffe [35] summarises several guidelines and categorises them into six headings. The other relevant issues are as follows:

- User centred design – this guideline details that user centred design should be practiced in order for you to get to know the user, which allows you to create a system that they actually want rather than what you think they want. It is also advisable to involve the user in participatory design as this makes them familiar with the end product and forms their expectations.
- Locus of control - it is essential to keep the locus of control with the user. This was done by making the user initiate operations (e.g. assigning swimmers to classes) rather than having them entirely automatic.
- System model – as mentioned above, involving the user in the design will allow them to form a mental model of the system, thus creating expectations and familiarizing them with the system.
- Human memory loss – you should account for human memory limitations by giving the user frequent closure on tasks. This means that due to the limitations of the human short term memory (i.e. it would be difficult to remember a swimmers ID), you should automatically fill in any relevant fields by using relationships and look ups. It is recommended to use drop down menus to allow the user to recognise, rather than having to recall data. These menus should be a reasonable size so that, if possible, every menu option is visible.
- Cognitive issues – this simply means use common sense and put things where users would naturally expect them to be i.e. the left and right arrows for navigation next to each other on the relative sides. It also means that drawing on real world analogies can be advantageous but only if the analogies are well known with the end user, otherwise unknown analogies create more confusion than necessary. This was designed in by having exit buttons in the top right hand corner as computer users would expect and also other navigation buttons in the top left, again due to normal computer users expecting to find the ‘open file’ option in this area of the screen.
- System messages – all messages should use user centred wording. They should be positive using non threatening wording e.g. do not use “FATAL ERROR!” as it can worry the user. Also use specific, constructive terms in error messages and make the system take the blame e.g. “System does not recognise input, please re-key”.
- Reversible actions – users feel more comfortable if they can undo their actions as it means mistakes are correctable. On all forms it is possible to add and delete records so that this

recommendation is met. The question is how far should the user be able to undo or go back? This has been designed in, so that rather than having an 'undo' button the user can simply re-edit the field. It is also possible to delete records in order to undo.

- Getting the users attention – this refers to the specifics within the interface. If used, features such as bold, italic and underline should be used sparingly. The selected font should be consistent, as should the font size and colour. The background colour should contrast with the text colour and colour conventions should be considered i.e. red meaning stop and green meaning go etc. The use of pop-up boxes will be used to get the users attention.
- Display Issues – the display should be organised in order to manage complexity. The screen should be balanced i.e. the same density of content in each quadrant. This also links in with the consistency issue, as the layout must be exactly the same - if anything is different by even one pixel the movement may give a jerky appearance when the user is navigating. Again, as mentioned previously, using a standard design template has helped achieve this.

Smith and Mosier [31] provide a full definitive list of 944 guidelines, although many of these guidelines are beyond the scope of this project. The list is very exhaustive and is split into six sections namely; data entry; data display; sequence control; user guidance; data transmission and data protection.

In addition to the above 'theoretical' design principles, due to the nature of the industry that the end user is in it is necessary to include some corporate branding in the system to make it easily identifiable and associable with Kirklees Active Leisure.

## **5.12. Design Methods**

Above, are the guidelines that the design should follow, it is also important to ensure you follow these design guidelines in the correct way. Throughout the project a user centred approach was essential. Thus, the users were actively involved in the design phase in that they participated in several workshops, which had the purpose of agreeing on a specific high level design.

The first workshop was part of the conceptual design and had the purpose of identifying the methods that should be associated with each table i.e. what actions/queries should be associated with each table. The basic E-R diagram was completed prior to the workshop and provided the base to work from. Each table was discussed and the actions needed were identified.



The second work shop involved presenting several potential designs (see Appendix L) to both the manager and two receptionists. The strong and weak points of each design were discussed in order to create an ideal design. This work shop acted as a further introduction to the system, allowing the users to associate interfaces to each section of the system as shown via the E-R diagram.

### **5.13. Other Design Issues**

Due to certain aspects of the system remaining paper based, it was necessary to discuss any possible redesigns of these documents, which include the swimming registers, the lesson slips and the certificate and badge authorization slips. It was decided that due to the development of a new system that these documents should incorporate a similar design to the system – again so they can be associated with the system and also so they have the corporate branding on them.

## 6. Implementation

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### 6.1. Introduction

As stated in an earlier chapter the methodology chosen was the conventional systems development methodology along with the prototyping methodology. This ensures full analysis of requirements and good documentation but then also a quick implementation and testing. In this section it is clear that the prototyping methodology took priority as the testing was done in correlation to the build of the system

### 6.2. Implementation Summary

As already established a database prototype is to be implemented using Microsoft Access. The functionality shall be gained by making use of the querying to manipulate the data in the required ways, the forms will aid data input and presentation and the reports will do exactly what you would expect by manipulating figures into a form where statistical analysis can take place and then reporting the results in a professional and automated fashion. To add further functionality some programming using Visual Basic was done. The implementation followed the following steps as outlined in each section shown below.

#### 6.2.1. Table Implementation

The tables and relationships as shown in the entity relationship diagram (Appendix I) were created and populated. The normalized attributes were chosen as shown in the data dictionary (see appendix). When the relationships were created it was necessary to select whether referential integrity should be allowed. This was selected and in most cases both cascade update and cascade delete were used – this ensures that relationships between tables remain consistent. Although cascade delete was not wanted for the deletion of financial records. The tables were then populated thus to allow on going parallel implementation and testing of the system, as the prototyping methodology suggests should happen. All tables were named “tbl\_<TABLE NAME>” thus to allow easy identification when writing queries.

#### 6.2.2. Query Implementation

There are a considerable number of queries within the system due to the need for data manipulation. The queries make use of inner and outer joins, selecting certain criteria e.g. all Staying customers, aliases and manipulation e.g. to create the Next\_Grade attribute the following IF Statement was used:

```

IIf(tbl_Swimmers.Status="Moving",
    IIf(tbl_LESSONS.Grade="Water Confidence","1",tbl_LESSONS.Grade+1),
        IIf(tbl_Swimmers.Status="Staying>Moving",tbl_Lessons.Grade,
            IIf(tbl_Swimmers.Status="Staying",tbl_Lessons.Grade,Null)
        )
    )
)

```

To summarise the above, the query creates the next grade for the swimmer based on their status, such that if you are a staying customer your next grade will be the same, if you are a moving customer your next grade will be an one higher than their current grade, but where the increment is not possible the statement says if you are moving and currently in water confidence then you next grade will be grade 1. It also deals with exceptions, where a staying customer requests to change lessons thus becoming a moving customer.

The system makes use of simple select queries to join tables and manipulate data, update queries to change existing table data e.g. changing a swimmers status if a deadline is missed, append queries to add new data to a table e.g. new lessons to the lesson table and delete queries to delete non paying customers from the new classes. The queries were designed by writing, in English, what was required; this was then translated into a query or a series of queries (see Appendix M)

### **6.2.3. Forms Implementation**

For the implementation of the forms, the design guidelines and rules as set out in section 5.11 were adhered to. There were a vast number of forms – some acting as primary forms i.e. for data entry, some acting as sub forms (to aid data linking), some of which were governed by visual basic code, as detailed in section 6.2.4 and some are pop up forms which helps in gaining user attention. The forms allow for data presentation, data input and navigation. Although the tables are the basis for the system, the forms are what many users perceive as the actual system. The sub forms, as mentioned above, allowed for a very shallow system architecture i.e. everything could be accessed within a maximum of two clicks via the main menu. All of the forms within the system had a consistent design and layout. Below is the Swimmers form which is central to the system, it shows examples of how the guidelines were strictly adhered to (although the screen shot below shows some unused area to the left, this is due to the screen dimensions of the machine used for the write up, it is not present on the end user machines):

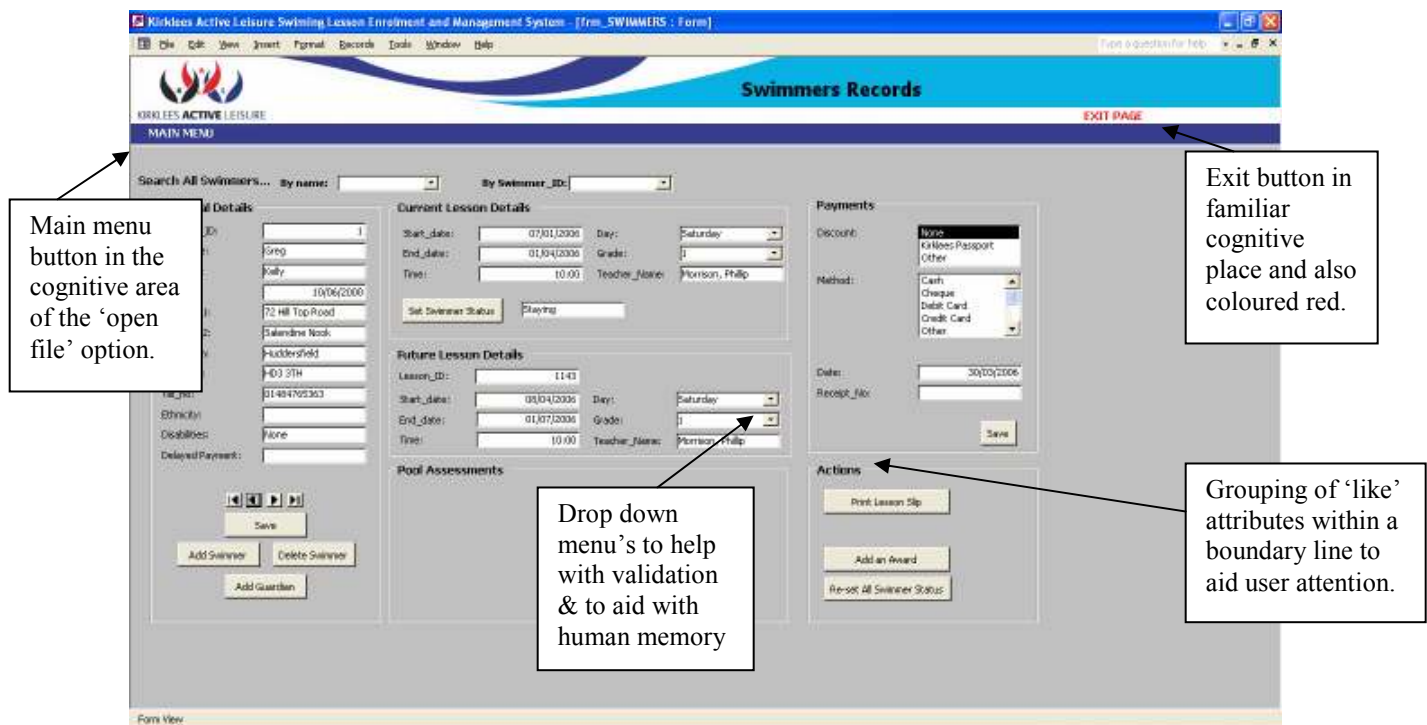


Figure 6.1: screen shot of the Swimmers form which was developed following the guidelines.

#### 6.2.4. Visual Basic (VB)

The use of visual basic within the system has increased the functionality and usability which will, in theory, increase the chances of user acceptance. VB can help with such things as navigation by means of navigation buttons for navigating through records within one form and also for navigation through the system as a whole. It also allows for user feed back such that if a user creates a new course of lessons they are aware they have done so:

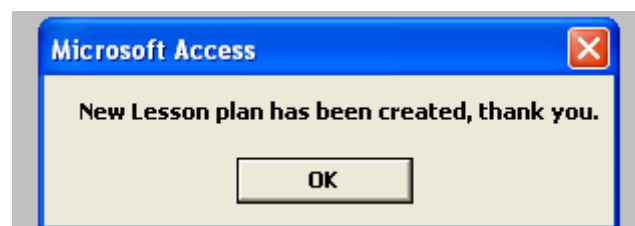


Figure 6.2: screen shot of the error message that the VB code produces.

Increased data security was also implemented via VB i.e. the ability to lock certain fields when input was not needed restricts the chances of any unintended data changes. It is also possible to use IF statements within the VB code thus being able to control whether, for example, the payments subform should be shown or not. A selection of useful pieces of code can be found in the Appendix N.

### **6.2.5. Reports Implementation**

The system is capable of creating several reports; all can be either viewed on screen or printed out. Each report is based on a table and/or a form/subform. This means that data from several parts of the system can be integrated together thus allowing for detailed and complete reports. The reports have the ability to perform calculations such as  $\text{=(Sum([actual pupils]) / Sum([max pupils])*100)}$  and  $\text{=Sum([profit/loss])}$ .

## **6.3. Prototyping**

As already established, the prototyping methodology has been followed for the implementation of the system. It allows for a product, which in essence, can be thrown away and re-developed if necessary or can simply be adapted. The system has been through three prototype phases, the first being to add the functionality and then the second to make minor adjustments to the functionality and the third to develop the interface.

### **6.3.1. Prototype v 1.0**

This system was developed in correlation with the initial requirements as detailed by the use case diagram in Appendix E. It had full functionality and was what the user had requested. Once trialed Gemma Ripley (Duty Manager) requested that several features should be added to increase functionality and due to the time available this was possible. The requests included:

- In the initial prototype, it was needed for all swimmers to have a 'status' as this was the key criteria for the method of processing. The new request was to ensure that all swimmers had a status set. This meant that when a processing button was clicked a query would run and if a swimmer did not have a status then they were highlighted and the processing would be cancelled until the status was set. This would reduce administration errors.
- The initial prototype was capable of handling the exceptions where customers are granted extended payment deadlines, but other than granting them the extension the system did not recognize if these extended deadlines were missed. This functionality was implemented.
- When customers miss a payment deadline, the initial prototype simply deleted them from the lessons and changed their status to 'Not Interested'. It was requested that rather than delete them, produce a report with their details on it so that the customers can be contacted and thus have the chance to retain the place.
- The ability to record refunds – this happens where a swimmer declines their place on the scheme. Additionally, a more valid reason where refunds are required is for swimmers who fall ill for a considerable length of the swimming lessons. If a doctor's note is obtained then

refunds are allowed. This functionality was accidentally overlooked in the first iteration of the prototype. This feature also had to be incorporated into the financial reports to maintain their precision.

#### **6.3.2. Prototype v1.1**

Once the above functionality was adopted, the prototype was re-trialed and it was concluded that the functionality met the needs of the business and it was agreed that the system was complete so far as functionality was concerned.

#### **6.3.3. Prototype v1.2**

This iteration was used to develop the interface. Several designs had already been conceived and the final choice was agreed upon. Therefore this iteration was relatively simple and just needed the interface perfecting.

### **6.4. Security**

Although, as identified in section 3.9, strict security is not needed, it was identified that a degree of security should be implemented. This was done using the MS Access features, which allows for a password to be added to the whole database, which ensures that the data and the system is safe from corruption. Within the system itself, it was decided that some additional security should be added to the processing capabilities related to the enrolment i.e. where the swimmers are added to specific classes. This was implemented so that from the main menu when a user tries to click on Staying Customers or Moving Customers a password is required. This was implemented using a pop up form, where a password would be entered, and some visual basic code. If the correct password is entered then the relative forms will be opened, otherwise if an incorrect password is entered access will be denied and the user will remain on the main menu screen. In addition to the user manual, a document on password management and how to change this password was given to the manager – see Appendix N.

## **7. User Documentation**

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### **7.1. Importance of User Documentation**

The system will be relatively alien to the end users as they will have only seen use case drawings, rough interface designs and possibly other documentation on the system requirements. Due to this, some form of training will be needed. It is possible for this training to be delivered by an expert of the system or via a manual to encourage self discovery and learning. A very advantageous approach, as experienced in industry, is to train an individual or group and then allow them to train the remaining staff with the support of either training material or a supplementary manual. This approach was taken, Gemma Ripley, the duty manager was trained in a one to one session comprising of a run through the system and several role plays. Then, once Gemma was confident, the responsibility of training the remaining staff was handed over to her. This shows that the documentation will be needed as a reference for Gemma, for the members of staff participating in the training and also for future reference. In addition to it being common practice to provide a user manual, literature reinforces its necessity. Shneiderman [34] states that even if considerable attention has been paid to user interface design, there is still a need for supplementary material to aid users, in both paper and online forms.

### **7.2. Sections of the User Documentation**

This document was created to aid with use of the system. It covers areas such as Swimmers; The Enrolment Procedure; Taking Payments; Lesson Management; Awards Management; Staff Management, (see Appendix O).

### **7.3. Sections of the Management Documentation**

This document was produced specifically for the managers and describes how to do the management tasks. It covers getting started with the system i.e. loading the initial data into the system, backing up the system and security. In addition to security, there is a brief section on password management (see Appendix O).

## 8. Testing

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### 8.1. Introduction

It is imperative that a system is tested before either a handover takes place or the system ‘goes live’. Many forms of testing are possible, but, as the prototyping methodology suggests and in order to save time, the testing can be done in parallel with the development. This requires the developer to correct errors as and when they are discovered. This approach was used through out all iterations of the prototype and this turned out to be a very effective method. Other methods used include exploratory testing, exception testing and a test run of the system, which is a more advanced method of role playing. Each is discussed in greater detail below.

### 8.2. Exploratory Testing

Bach explains “...exploratory testers take the view that writing down test scripts and following them tends to disrupt the intellectual processes which makes testers able to find important problems quickly” [36] therefore due time constraints exploratory testing will be used. It is widely thought that exploratory testing tests design and execution at the same time. Exploratory testing works on the basis that the next test is influenced by the result of the previous test and Bach states that, “it yields consistently valuable and auditable results” [37]. The testing did not highlight any major errors, just minor spelling mistakes within the VB code and such errors as the mixing up of attributes in IF statements such that:

This...		Should be this...
<i>IF text14 = "paid" THEN</i>		<i>IF text14 = "paid" THEN</i>
<i>    [Subform].Sourceobject</i>	=	<i>    [Subform].Sourceobject</i>
<i>    "frm_NOT_paid"</i>		<i>    "frm_paid"</i>
<i>ELSE</i>		<i>ELSE</i>
<i>    [Subform].Sourceobject</i>	=	<i>    [Subform].Sourceobject</i>
<i>    "frm_paid"</i>		<i>    "frm_NOT_paid"</i>
<i>END IF</i>		<i>END IF</i>

The exploratory printing tested the functionality within the system, as detailed above. In addition to this the printing of documents was also tested. This was done to ensure that the documents are easily readable and are printed as they appear on the screen. The results were that the documents looked odd when printed due to the size of the margins therefore the margins were altered which made the documents more aesthetically pleasing.



### **8.3. Exception, Extremes and Validation Testing**

Within the exploratory testing the exceptions and the extremes to the validation rules were specifically tested as these are most likely to produce questionable results. The exceptions include the delayed payment deadlines, the staying customers requesting to change classes and under 5's being authorized into the Grades. All exceptions were found to be fully functioning. The extremes testing proved useful as some boundaries had been incorrectly set and the validation testing also highlighted a few errors. The results for this can be seen in Appendix P.

### **8.4. Test Run**

On Sunday 19<sup>th</sup> March a full normal enrolment was scheduled for new customers – these tend to be the most problematic situations. This environment was used for a test run with real customers and real data. Prior to the start, the system was synchronized with the real data i.e. the paper based system, in order to be accurate. The system worked extremely well, processing 47 swimmers and averaged approximately six customers to every four that were processed through the paper based system – although this slower rate may be accounted for by the payments, which were not taken in the trial run but obviously were in the real system. The system was actually used by the management to print out the availability posters as this was so much easier than tallying up within the paper based system. Overall, the test run was very smooth with the only minor faults being several fields not large enough for the data (e.g. addresses and double barrel names). This success may be down to the fact that I was in control of the system. Although, when the enrolment neared its end and became quieter, an opportunity was produced for the staff to trial the system, which also acted as a usability test. The staff looked comfortable when using the system and simply using their intuition and initiative they were able to use the system asking very few questions.

### **8.5. Hand Over of the System**

Once the testing was complete the system was put on disc and handed over, along with the user manual and the management manual.

The initiation of the system had already been started by the test run, as described above. The test run required the system to be loaded with real data – details of how to do this are provided in the Management Manual described in 7.3. During the test run, only a percentage of the swimmers were processed via the system, therefore it was necessary to ensure all details were up-to-date and correlated with the paper based system. Once this had happened the system was ready to be used

permanently. Due to possible unforeseen circumstances, the management of KAL decided to adopt the system in parallel with the paper based system for the first 13 week cycle of lessons. This would fully justify and verify that the system is capable of the tasks in hand. Although this would mean that efficiency would decrease for the thirteen week trial run, it would also decrease the possibility of any risks.

#### **8.6. Testing Conclusion**

The testing unequivocally proves that the system is fully functional and easy to use. Additionally, in an abstract way (abstract due to not taking the payments in the trial run) the testing also shows the systems superiority to the paper based system, in that it was used to produce the availability posters and also its faster through flow of customers. One difficulty of testing the system was brought about because of the high use of dates – current lessons and future lessons. Also the fact that in real life the system would run on a thirteen week cycle, proved problematic when testing as it is obvious that a thirteen week test period is not possible within this project. Due to this the system was adapted to work on a two week cycle, thus allowing for full testing. Additionally, the lesson start and end dates were selected to fit in with the testing period.

## 9. Evaluation

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### 9.1. Introduction

The evaluation of an information systems project is a vital part of the project although it is often over looked, Brown [38] states this is because ‘evaluation is difficult’ and it is a ‘wicked problem’. There are many evaluation methods available but I shall be structuring my evaluation around each section of the project. The first task in regards to evaluation is to define and justify the evaluation criteria followed by investigation as to whether the initial problem has actually been solved. Once this is complete it is possible to compile the results of the evaluation.

### 9.2. Evaluation Criteria

The whole project has had aims and objectives as set out in the introductory chapter; it is possible to use these as high level criteria although they, alone, would only form a very speculative evaluation. To reinforce these I feel it would be useful to use the user requirements as additional criteria – these were determined in a workshop involving the end user, and therefore can be taken as being accurate criteria for a true evaluation. Other areas the evaluation will focus on include; the effectiveness of the methodology used, an evaluation of the organizational and social consequences of the systems introduction, a quantitative evaluation converting the systems efficiency into some precise figures, an evaluation of the testing methods used, a comparison of the other products and finally, as initiated by the end user, evaluation by means of re-testing via the QUEST self assessment questionnaire.

### 9.3. Aims and Objectives

The aims and objectives of this project can only truly be determined once a full evaluation has been carried out. This is because they are very high level and therefore even though all aims and objectives are present and complete within this project, it is not yet possible to say to what degree they have been met. Additionally, time will show the true extent to whether the aims and objectives have been met.

### 9.4. User Requirements

Within the feasibility chapter of this report the user requirements, as first identified in the use case UML diagram, were condensed into the following fourteen statements:

1. *Allow for staff to indicate the status of current customers (i.e. moving or staying) and the ability to change a customer’s status.* – This is possible for every customer via the swimmers

form, further to it being possible it is vital that this is done as the swimmers are processed by their status – as was discovered in testing. The discovery in the testing meant that further functionality was added meaning that before any processing took place, the user was alerted to any swimmers whose status was not set.

2. *Be able to inform customers of their status (indirectly)* – this is possible via printing of the lesson slips. Additionally, these slips are personalised so that staff know exactly who has and who has not received indication of their status – a feature that management were particularly pleased with, where as the teachers were unsure due to the extra time it takes them to hand out the slips (this is because lessons finish for example at 10.00 and the next lesson starts at 10.00 therefore there is no time to hand out the slips – but this was also a problem with impersonalized lesson slips). In addition to notifying moving customers of their status, their possible options are also identified i.e. if a child is moving into grade 3 then only the grade 3 lessons are available to select on their preference slip. This will reduce confusion over what the possibilities are for the specific grade the customer is moving into.
3. *Be able to register when a customer confirms their interest and process customers into the relevant classes, preferably in accordance to their preferences* - this is possible, staying customers register their interest by simply paying, which automatically adds them to their relevant class – thus removing the need to sift through staying lesson slips and adding them to booking sheets (as was needed previously). Moving customers register their interest in the same way as before i.e. selecting their three preferences and this then needs sifting through by the duty manager but with the added functionality of being able to select high priority swimmers i.e. those with siblings within the lesson schemes.
4. *Be able to indicate whether a payment has been received and ensure that the receipt number has been stored* – this is possible, once a swimmer is added to a class, the payment screen is shown, this must be completed in order to add a child to a class and in order to complete the payment, the mandatory receipt number field must be completed. Once a payment is completed the payments screen will automatically change into the paid screen showing the receipt number (using an underlying Visual Basic IF statement to change the sub form) thus aiding usability.
5. *Be able to deal with exceptions in regards to payment deadlines* – the system has the functionality where, if an extension to a deadline date is agreed then the date is recorded. This date then prevents the customer being processed as a ‘Not Interested’ customer. The exploratory testing also highlighted the issue that the users of the system need informing if the extended payment deadline passes. Therefore, increased functionality was installed where

by a query ran every day the system was opened to check for [Delayed payments]<Today, if so the user was manually required to process the relevant customers.

6. *Be able to delete non-paying customers-* initially this task is done automatically during processing the customers. When a payment deadline is reached the relevant button is clicked on and this deletes those customers who initially showed interest but did not pay. After request from the management this was changed so that the customer details were shown thus allowing them to be contacted to ensure business was not lost and to offer a better customer service. If the customer was not interested then it was possible to delete them, otherwise the user would be taken to the payments screen.
7. *Be able to add new customers* - this is a simple feature of the swimmers form. Once a swimmer is added, the user is also taken to the guardian form to either add a new guardian or add a new relationship to an existing guardian.
8. *Be able to enrol new customers ensuring the business rules are adhered to.-* this is possible, the business rules being:
  - a. *Swimmers must be six years old to enter the grades* – this is calculated using the `lesson_end_date` – `date_of_birth`. If the child is younger than six a pop up warning appears – the user can still proceed as exceptions where teacher authorization is received are allowed.
  - b. *Swimmers can only enroll for relevant grades* – this is implemented as there is an attribute that only allows a swimmer to enroll if it is equal to the grade they wish to enroll onto. This can be next grade, which is automatically calculated for moving customers, proof of grade for other sites customers and pool assessments for new customers otherwise the only available grade will be water confidence or grade 1.
  - c. *Lessons must have a max of 12 swimmers (10 for Water confidence)* – this is implemented on the basis that all current lessons meet the requirement. Otherwise this is implemented by only showing a class if the availability is greater than 0. This restrains the user to only adding swimmers to classes that have some availability..
9. *Be able to process documents i.e. pool assessment forms, badge/certificate slips etc.* - this is not possible through the system, but the business processes have been revised so that the details the documents hold is now stored within the system and no document is needed. The result of storing the details within the system is that there is a reduced need for paper thus no printing costs.
10. *Be able to create new lessons-* this can happen from the lessons form and is very simple.

11. *Be able to store reserves (a reserve list)* – this is not possible as due to the large demand management decided it was too much of a chore to have a working reserve list and that they would work on a first come first served basis. Although, there is a page where simple comments relating to anything can be stored. The management thought that if a reserve list was to be needed in the near future then they would devise a standard layout for storing reserve list details via this comments page.
12. *Be able to store staff details-* this is possible and details can be seen via the Staff button on the main menu.
13. *Be able to create financial balance sheets* – these can be accessed via the main menu and have full statistical detail as requested by the management. They can be printed and will save a large amount of time as everything is processed automatically.
14. *Be able to create statistical figures to aid management decisions-* as above.

### **9.5. Evaluation of Chosen Methodology**

The chosen methodology was primarily the conventional systems development methodology with joint application of the prototyping methodology. I truly believe this was the best and most appropriate choice for this project due to a number of reasons:

1. Project management – due to little previous experience of planning and managing a project that covers such a time frame I needed a methodology that had clearly set individual sections i.e. the conventional waterfall methodology. This allowed for clear milestones and deliverables being set, thus permitting for relatively pain-free project management.
2. Documentation – the conventional methodology is very thorough when it comes to documentation. This goes hand in hand with the management's requirement for a maintainable system. There is currently at least one member of staff who has knowledge of MS Access and with the appropriate documentation will be able maintain the system as required.
3. Tools and Techniques – the conventional method is welcoming of other methodologies tools and techniques, therefore there is not a definitive list of tools/techniques that must be used. This flexibility was very useful.
4. Time limits – the use of the prototyping methodology became apparent near the end of this project and allowed for swift implementation and testing of the system. Additionally, due to expected change of requirements, the use of this methodology allowed for a second iteration of the prototype, which was very useful.

## **9.6. Evaluation of Social and Organisational Consequences**

Brown [38] states that “An ICT project has two key factors to assess and manage; the hard ones on the nature of the technology and what it can do and soft ones associated with the social and organisational consequences of implementing and using the technology”. Additionally, Khalifa et al [39] say that there is “sufficient evidence in the Information Technology (IT) literature to suggest that IT system users are being excluded from the IT evaluation process”, and they go on to say that this should not be the case. This provided sufficient reason to evaluate the organisational and social effects via interviews with the staff directly involved with the system:

- Gemma Ripley (duty manager) – “Positive” – identified the main positive aspect as being the automatic creation of the balance sheets and also the help available in grouping the moving customers was appreciated – especially after the second iteration where the increased functionality of grouping by preference was implemented.
- Sue Cornish (swimming teacher) – “Sceptical” – due to the failure of Pool IT, Sue still had some scepticism, although was happy about her duties not changing as the Pool IT system had required.
- Richard Marshall (receptionist) – “Positive” – very impressed with not having to copy staying customer’s details from their lesson slips onto the booking sheets and the automation of printing the registers was described as “simple but brilliant”.

Overall, the organisation seems keen on change but they require the backing and cooperation of all their staff and currently due to the demographics of a large proportion of the staff there is some reluctance to change. Taking this into account I feel this system is a useful advance/step for Kirklees Active Leisure.

## **9.7. Quantitative Evaluation**

Evaluations are always more commendable if they are quantified thus showing exact figures. It is possible to produce several quantified statistics on several areas of the system. This can be done by calculating the cost saved by the increased efficiency of the system. For example, in the previous system the creation of a register would take approximately 2 minutes (finding the booking sheets, printing a blank register, copying the details and then putting the booking sheets away). When there are 45 lessons this whole process takes about 1.5 hours. To complete the calculation, using the hourly rate of £7.45 an hour and knowing that the swimming lessons run on a 13 weekly cycle, it is possible to calculate the annual cost of simply creating the registers at £44.70 a year. Compared with several clicks of a button and the printing time, which is what is required to create the registers in the new system. In total seven areas were identified as potential

cost savers and it was calculated that, in theory, approximately £375.04 or approximately 48 man hours could be saved – a full list of savings can be found in Appendix Q.

### **9.8. Evaluation of the Testing Methods**

The testing methods (i.e. ongoing and exploratory testing and a test run) were very thorough and covered all areas of the system. The fact that errors were identified, alone shows that to some degree the testing was successful. The major bonus of the test run is that it not only tests the system and the usability, it also tests the running of the system in the actual real business environment. Although, full unit testing was not done i.e. testing each and every entity, it was not felt that it was needed as the ongoing tests showed that most, if not all entities were working as expected. The exception and extreme testing shows just how thorough the testing of the system was and should guarantee an almost perfect system for the end users.

### **9.9. Evaluation in Comparison with Other Existing Products**

If a direct comparison is done with the Pool IT system, you will see that the functionality is very similar. Granted that the Pool IT system has some extra functionality but as was realized by Kirklees Active Leisure this added functionality can cause more problems than needed. The main functionality is very similar in that both the system created and Pool IT can store swimmer details, can assign staying swimmers to the next lessons at the click of a button. The Pool IT system does not allow for any swimmer choice if they are moving up a grade they are simply added to a relevant class regardless of customer input – this class then has to be changed if it is not appropriate. Both systems have the ability of creating personalized customer status letters. Both allow store awards details for each customer and both systems store some form of staff availability. It is a positive sign that the functionality is very similar as the initial request was to create a system like Pool IT but where it is not necessary for direct input from the swimming teachers after each lesson. Therefore this evaluation is very positive.

### **9.10. Evaluation Using the QUEST Assessment**

As mentioned in Chapter 3, QUEST is an award which recognizes quality within the leisure industry by means of several forms of assessment, with one being a self assessment questionnaire. The questionnaire was handed out to the users of the system after the test run had been completed and they all completed and returned them to myself or Gemma Ripley (Duty Manager). The return rate was 14 out of 14. A session was arranged with Gemma to evaluate the average results of the questionnaires, with her knowledge and experience of QUEST the conclusion that the new system will *definitely* increase the centres score was reached (these results are shown in Appendix



R). Unfortunately, as had first been hoped, it is not possible to put a precise number on the amount of extra marks that the system will gain for the centre. This is due to the questionnaire being only one of several forms of assessment, each of which contribute to the overall score. It is worth commenting that the system should also aid with the other forms of assessment, i.e. mystery visitors who enquire or purchase any swimming lessons or enquire about the awards related to the lessons. It was finally concluded that the system, once initiated will be of huge value to the centres normal running and also to the centres image. The theoretical savings such a system would create are “eye opening” and “...will most likely alert higher management to potential solutions else where in the centre or even at other centres throughout Kirklees Active Leisure”.

#### **9.11. Future Enhancements**

The future enhancements that may be possible include allowing the current customers within the system to submit their preferences via the internet. This option was considered for this project but was ruled out for a number of reasons; the management felt it would create more problems due to taking the processing control away from them; this would most likely result in a low rate of user acceptance. Also because the swimming lessons service is quite a personal service with high levels of customer-staff interaction the management felt that this would disappear with such a system, thus reducing customer relations. A further extension would be online payments; this would be more acceptable and would save considerable time for the reception staff. Although, I do not feel there was sufficient time, knowledge or skills available for this to be implemented within this project.

#### **9.12. Conclusion**

Although, the several forms of evaluation all indicate the system has been a success, the biggest test will be the thirteen week parallel run that is now happening. It would have been very useful to incorporate this parallel run into this project evaluation, although thirteen weeks is a considerable time frame and it would not have been possible to do so. Even though, due to the justification of the chosen methodology, the requirements being met, the QUEST evaluation being positive and the quantitative evaluation showing savings can be made, I personally feel the system, dependant upon a longer term evaluation in the parallel run, has been and will be successful. Additionally, because of the success of the system and the project as a whole, it can be exclusively said that the aims and objectives have been met.

To further emphasise the achievement of this project the minimum requirements should be referred to, showing that they and several further requirements have been met.

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## **Appendix A Personal Reflection**

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Overall, this project has been a very useful and fruitful experience, which I am certain, will be beneficial in the future. In the beginning I was anxious about what project to undertake as I felt the options posted on the newsgroups were primarily aimed at computing students and that they did not really relate to the modules that I, as a joint honours Information Systems and Management student, had studied. Therefore once I had spoken to my previous employers at Kirklees Active Leisure I felt this was definitely a more attractive problem to tackle. After some investigation into what it would comprise of, it was selected as my project.

Before the project was started I consulted several people in regards to project selection and I was given the response of ‘...select a project that you are interested in!’ This, I feel was the best piece of advice and something I learnt as the project developed. It gave me more motivation to get things done and to do the research than if I had done a project of less interest.

Another lesson learnt is that in the initial stages of the project, it is best to get started as soon as possible. I was unsure as to where to start, but my initial meeting with the end user acted as a great starting point and led onto several other pieces of work. Therefore, I would advise all future project students that if they are unsure on what to do first, simply get something done (even if it turns out not to be relevant) as it gets the project started. Once the project was underway I felt a lot happier.

I feel this project has been very challenging, due to it being quite different to anything I have undertaken in the past, therefore problems did arise. The main difficulty was actually meeting with my end users. This is because Kirklees Active Leisure is in Huddersfield, which is near Leeds, but due to my work commitments (university and part time work) was difficult to get to. To extend the problem further, my main correspondence was with Gemma Ripley, is currently only working part time as she is also studying towards some qualifications. Therefore between the two of us it was difficult to arrange meetings. To get around this problem I simply tried to book meetings well in advance and/or corresponded with other staff at the Leisure centre.

A further problem that arose was the problem of creating the plan. It is difficult to create a plan for such a long period as it is inevitable that problems will arise. This meant that in the weeks prior to the Easter break I had three pieces of coursework of significant size on top of the

scheduled project work. Although, I was expecting the coursework's, I was not expecting the deadlines to be on the same day. To get around this problem I simply had to work very long days and re-schedule certain things. A lesson learnt from this is that it may be advisable to do an uneven split of modules in each semester, with seventy credits being taken in the first semester and fifty in the second.

In conclusion, the project and the system that has been created have been, from my point of view, successful. I feel I fully understood the problem and the situation in hand. I then created a system which extend from the minimum requirements and completed certain further requirements. My project management was reasonable and I feel I have written a thorough report. The project also created valuable experiences which will be useful for job interviews and future employment. Additionally, I am proud that the system has been gratefully accepted at the leisure centre, which I feel is a positive and telling sign of the overall success.





## Appendix C Process Identification

Complete list of processes as identified in the requirements analysis.

Process ID	Process Name	Description	Documents Involved	People Involved
<b>Enrolment Processes</b>				
E1	Classifying current customers	The swimming teachers classify the current customers into two groups; moving and staying i.e. moving grade or staying in the same grade.	Current registers	Swimming teachers.
E2	Creation of lesson slips	Lesson slips are created in order to inform the customer of their situation i.e. moving grade or staying in the same grade.	Current registers, Moving slips and Staying slips	Receptionists and possibly Duty Manager
E3	Distribution of the slips	Teachers hand out the staying and moving slips.	Moving slips and Staying slips	Swimming Teachers and Customers (swimmers and parents).
E4	Returning of the staying slips	Those customers who are staying in the same grade have to indicate this by returning the staying slip to reception. Once the slip is returned, the receptionist will add the child's name to the booking sheets.	Staying slips, Booking sheet	Receptionist and staying customers (parents)
E5	Staying customer payments	Staying customers are also required to pay for the lessons before a published deadline. When the payment is made the receptionist is required to enter the receipt number into the booking sheet. If the payment deadline is missed then the child's name will be taken off the booking sheet. If a customer is not happy with their current class they can change classes by changing classification i.e. becoming a moving customer.	Booking sheet, Payment receipts	Receptionist and staying customers (parents)

E6	Returning of moving slips	Those customers who are moving up a grade are required to complete their class preferences i.e. day, time and teacher, from the list of available lessons. They must then return the slip to reception.	Moving slips	Moving customers and any staying customers who have requested to move class.
E7	Enrolling moving customers	The duty manager sifts through the moving customer slips in order to enrol each customer on one of their three preferential classes. This is usually done by sorting the customers to ensure that parents who have several children within the lessons are dealt with first, as these can be the most difficult customers and it makes sense. Most customers are enrolled onto one of their three choices.	Moving slips and the booking sheets	Duty manager
E8	Moving customers payments	Once all the moving customers are enrolled they are required to pay for the lessons. This can be done over the phone or in person. Alternatively, if the enrolment is in summer many families go on holiday – those who go on holiday and miss the payment deadline are required to show proof of their holiday and they can then either leave a cheque at reception or agree on a new payment deadline. Any customers who are not satisfied with their allocation of lesson can withdraw from the lessons totally, withdraw from the lesson and be added to the reserve list or settle for their allocation and be added to the reserve list.	Booking sheet, payment receipts, proof of holidays, reserve lists.	Duty manager, receptionists, Moving customers.
E9	Enrolling other sites customers	Once the moving customer payment deadline has passed customers who have previously been enrolled on the swimming lessons at other KAL sites are allowed to enrol. They get one day preference over the general public. They must provide proof of their grade provided by their previous teacher and their only options are from the classes that still have spaces available.	Booking sheets, Payment receipts and Proof of grade.	Duty manager, receptionists, Other sites customers.

		Other sites customers are also allowed to be added to any reserve lists that they qualify for i.e. the reserve lists for the grades they have proven to be competent for (via their proof of grade).		
E10	Pool tests	Any potential new customers wishing to enter the swimming lessons at a level above grade one must first complete a pool test. They first have to book the test with reception. The test then comprises of a teacher assessing the child(ren) to evaluate their level of competence. The teacher then completes a pool assessment form and photocopies it – one is kept by reception and one is given to the customer to bring along to enrolment.	Pool assessment form,	Swimming teacher, receptionists, New customers (adult and child)
E11	New customer enrolment	<p>New customers are dealt with on a first come first serve basis as there are only limited places available due to the staying, moving and other sites customers receiving preferential treatment. Usually the demand is very high and due to the first come first served basis, customers have been known to arrive at the Leisure centre as early as 07:00 for a 09:00 enrolment start.</p> <p>New customers must meet the business rules (stated in the next section). This means that if they want to enter the lessons at a higher grade than grade one, they must have completed a pool test prior to the enrolment. If this is the case they must bring the assessment form with them as proof – this is compared against the stored copy to ensure it has not been edited.</p> <p>If there is space available in any relevant class the customer can enrol – this means provide their personal details and payment.</p> <p>New customers are also allowed to be added to any reserve lists that they qualify for i.e. the reserve lists for the grades they have proven to be competent for (via the pool test).</p>	Assessment form, Payment receipt	Receptionist and new customers.

<b>Admin Processes</b>				
A1	Creation of badge/certificate slips	Reception must ensure that swimming teachers have enough slips for the teachers – especially when nearing the end of a cycle as this is when demand for badges and certificates is highest.	Badge/Certificate authorization slips	Receptionist and teachers
A2	Recording of certificates to be printed	When a customer requests for a certificate, the normal practice is for the receptionist to log the request (with the customer details) in the certificates book. This will then be checked at a quieter time and certificates will be printed out and stored, waiting for the teachers to sign them.	Certificate book	Receptionist and teachers
A3	Storing teacher details	It is necessary to store teacher details for emergencies such as when the normal teacher rings in sick it is necessary to try and get a replacement therefore the teacher details are stored.	The address book	Receptionists and teachers.
A4	Storing customer contact details	It is necessary to store customer details for such events as mentioned above i.e. where there is no teacher available and the lesson is cancelled or for any other cancellation.	The booking sheets	Receptionists and customers.
A5	Creation of Registers	Once the enrolment is complete it is necessary to copy the information from the booking sheets onto the registers in order for the teachers to use once the lesson cycle begins.	The booking sheets and the new registers.	Receptionists
<b>Financial and Management Processes</b>				
FM1	Creation of statistics sheets (1)	The duty manager is required to calculate the percentage of the capacity used for each of the classes for each day of the week i.e. if the Water confidence class has a capacity of ten and only nine customers have enrolled the utilization will be 90%.	The booking sheets	Duty manager
FM2	Creation of statistics sheets (2)	This relates to the number of people enrolling on each grade. The management are well aware that a majority of children drop out after grade three but they are interested in the exact numbers of children on the latter grades.	The booking sheets	Duty manager

FM3	Creation of financial sheets	The duty manager is required to calculate the profits for each of the classes for each day of the week taking into consideration the income i.e. the number of people enrolled multiplied by their payment (payments vary due to a variety of discount cards) and the expenses based on the hourly rate of running the pool.	The booking sheets	Duty manager
FM4	Teacher statistics	This is calculating the number of passes each teacher gets i.e. the number of people who move up a grade. This is simply so that the management can monitor teacher performance. The figures are not always useful due to having a difficult class or the children in the class not meeting the business requirements i.e. being too young to move up a grade.	The booking sheets and old registers	Duty manager
FM5	Create new lessons	Once the management have created and analysed the statistics they may decide that the demand on the reserve list is too high to ignore. There options are to create a brand new lesson or to change a lesson i.e. if a lesson is currently Grade 4 but it is not full they may wish to change it to a grade 1 in order to accommodate more customers. All changes must be agreed with the participating teachers.	Booking Sheets, Reserve lists, Stats sheets.	Duty manager, Teachers
<b>Physical Processes</b>				
P1	The pool test	As mentioned in E9 all new customers who which to enter into the lessons at a higher grade than grade one must complete these. They are a fifteen minute assessment of the child and they are carried out by the swimming teachers who take the lessons. They score them on certain criteria as set by the syllabus for each grade. They ensure that the child enters at the correct grade.	Pool test assessment form.	Swimming teacher and the customer (child)

## Appendix D Document Identification

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Below are the documents that are used within the current system, as identified in the requirements analysis:

Document Name	Description
Current lesson registers	<p>The registers cross reference the children's names with which part of the grade/syllabus is taught each week. They allow the teacher to track attendance and also each individuals abilities and improvements i.e. if John Smith is present he will get a tick in week one but if he also successfully retrieves a brick from the bottom of the swimming pool he will receive a second tick.</p> <p>These documents are also used by the teachers to indicate whether a swimmer has passed the grade or not. They are a vital part of the current system.</p>
Staying slips	<p>These are small pieces of paper that are given to those children who did not pass the grade and are therefore staying in the same group. They are used to indicate whether a customer wishes to continue with the lessons and they need to be posted into the correct post box in reception in order to be added to the booking sheets. If a customer does not deposit the slip it is regarded that they do not want to re-enrol.</p>
Moving slips	<p>These are small pieces of paper that are given to those children who pass a grade and are required to move to the next one. Once the child or parent has the slip they are required to fill it in and return it to a post box situated in reception.</p> <p>The details that are asked for are the child's name, the grade they will be moving to and their current instructor (these details help locate the child's details from previous registers in order to copy them on to the new registers). More importantly, these slips also allow the customers to select three preferences for the class they move into i.e. the specific time, day and teacher they want. This is used to help enrol them onto suitable classes.</p>
Booking sheet	<p>These are used to record the details of those customers who wish to re-enrol or enrol for the first time. A booking sheet is created for each swimming class that is available and the customer's details (names, date of birth, contact details and addresses) are added to these sheets when they submit their moving or staying slips or if they are new customers, when they show interest. Once a customer pays for the lessons the receipt number is recorded next to their name as proof of payment.</p> <p>Those customers who show initial interest but then fail to pay by the given deadline are taken off the booking sheets and replaced by other customers. This makes them very chaotic and messy.</p>

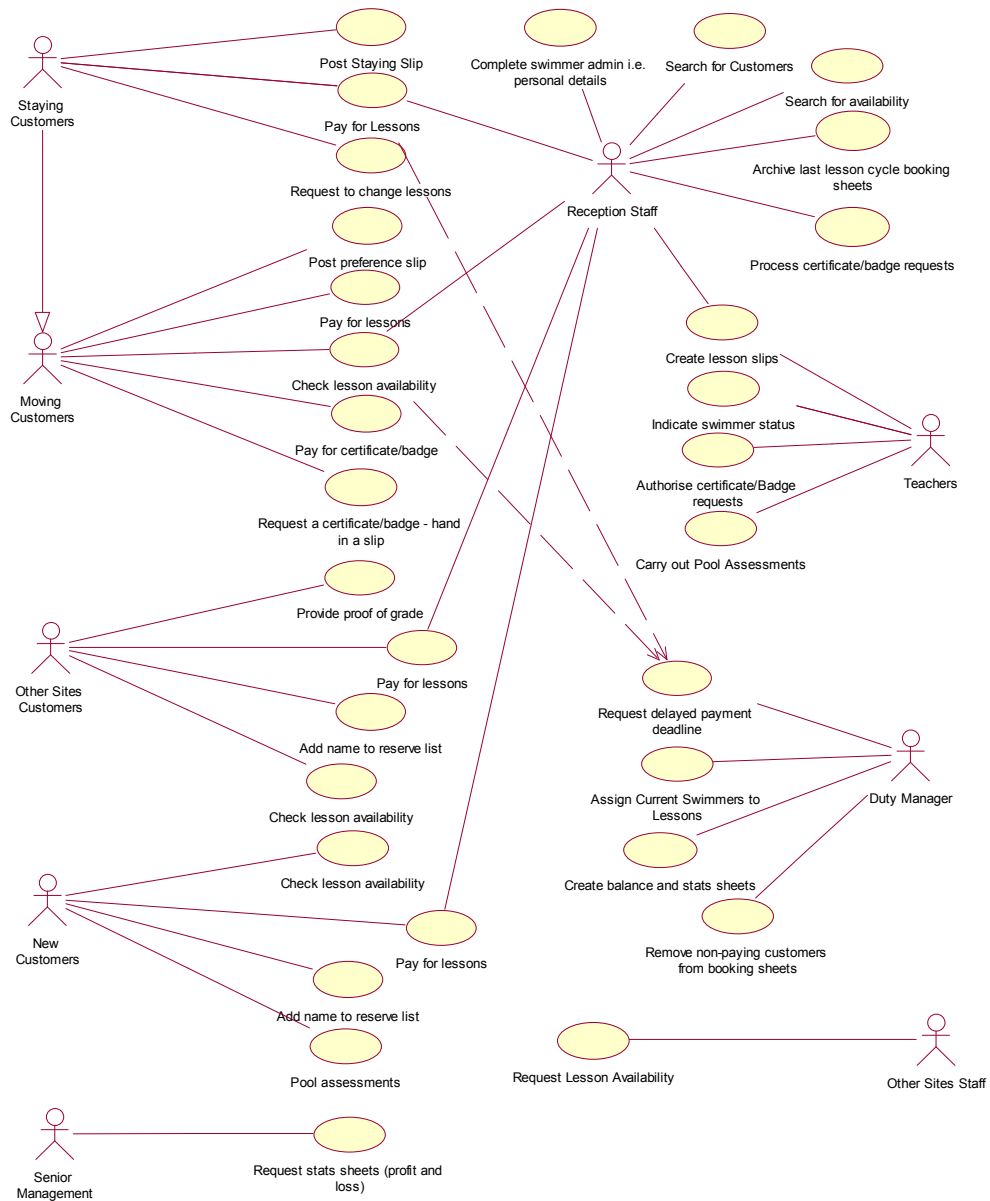
Payment receipts	These are automatically generated receipts that are produced by the till. They each have a unique ID number which, as stated above, is recorded onto the booking sheet – if the receptionist remembers (which is vital that they do!). The receipts, as with any retail receipt, are given to the customer on completion of payment.
Proof of holidays	<p>These documents are required from customers who will miss a payment deadline due to being on holiday. They are necessary due to the initial number of false claims that were received due to customers wanting to pay when they were ready to rather than when the business wanted them to.</p> <p>It can be in the form of travel tickets or a document from a travel agent stating the departure and return dates. They simply need to be seen – they are not held or copied. Once they have been seen a new payment deadline is agreed on. The details of the deadline being stored in a holiday's book kept in reception. The burden is on the customer to meet the deadline and not on KAL to reserve the place once the deadline has passed, as demand is always high and the place can always be filled.</p>
Reserve list	This is for customers who are either unhappy with their allocated class or for customers who require a grade that is already full i.e. the water confidence and the earlier grades often fill up rapidly and there are only a limited number of places available. If this is the case they are added to the reserve list. If any other customers either fail to pay or withdraw from their place then the reserve list is used.
Proof of grade	This is in the form of a signed swimming card – a document which is standard throughout Kirklees leisure services, which has a description of each grade on it and is supposed to be signed off by a qualified teacher when an individual passes a grade. Alternatively it can simply be any document that proves the customer has obtained what they say they have. It is used as verification to ensure they do not cheat the system.
Pool assessment form	<p>This is a form that is completed by the assessing teacher for all pool assessments. It includes details such as the child's name, date of birth, phone number, receipt number (to ensure the assessment has been paid for), date, recommended grade, date of next enrolment and the assessors name and signature.</p> <p>The document is copied and one is stored in reception and the other is given to the customer, who needs to produce it when they enrol.</p>
Badge/Certificate authorization slips	These are small pieces of paper which have a child's name on them, the grade they have passed and an authorising signature. They are handed over to reception to verify that the child has passed the grade and is entitled to the reward.



Certificates	These are specific documents that are purchased by KAL from the Amateur Swimming Association. When a customer requests one, the relevant certificate needs to be found then the appropriate template document on the computer needs to be edited to the child's details – this template ensures that the details are printed in the correct area on the certificate.
Certificate book	This is book is used at busy periods at reception. Instead of printing the details onto the certificate straight away they record the details I the book and the printing is done at a later date. The book is also used to indicate at what stage a certificate is at i.e. not printed, printed awaiting signing by the teacher or awaiting collection by customer. Although, staff regularly forget to change the book which means certificates are printed twice or certificates are lost etc.
New Registers	These are blank templates which are printed out and then the details from the booking sheets are copied onto them or typed onto them prior to printing. These must be prepared in time for the first lessons.

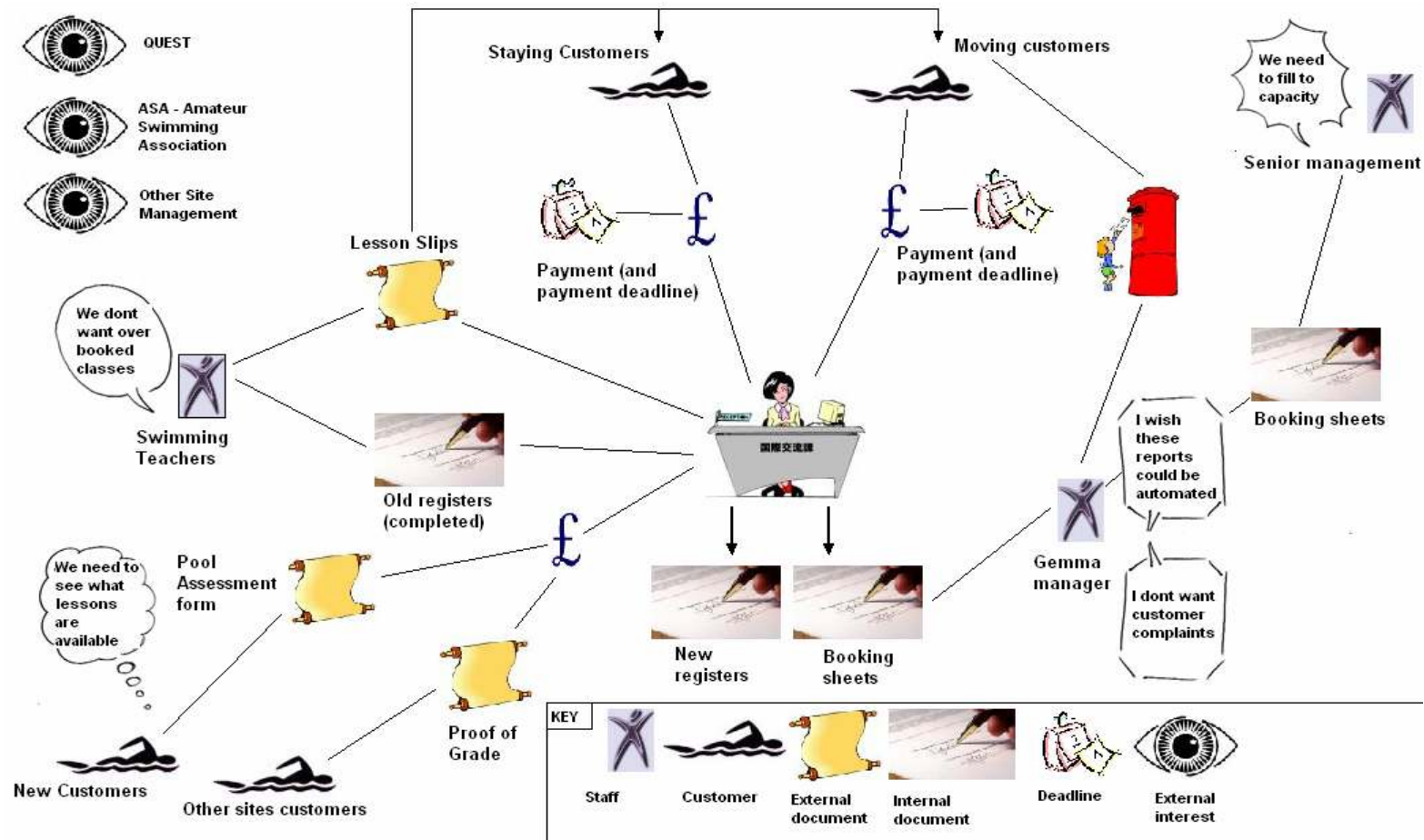
## Appendix E Use Case Diagram

The below use case diagram was created to define the current system:



## Appendix F Rich Picture

### Rich Picture



## **Appendix G Feasibility Report**

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### **Executive Summary**

This report aims to investigate the feasibility of creating a solution for Kirklees Active Leisure that will overcome the problems faced during swimming lesson enrolment and the management of the customers and the finances at the Stadium Leisure Complex.

This report considers the problems that are currently present during enrolment and also with the management of the lessons.

The requirements and specifications are identified, as are possible solutions, whether they are current off the shelf packages or specifically designed solutions. Each possibility is evaluated and the most feasible is chosen. Other issues such as ethical, safety and legal issues are covered and a conclusion is made on the chosen method.

### **Project Description**

This project aims to systemize a currently paper based system. Once a system is developed, a standard way of working will be introduced allowing for more efficient working, thus saving time and effort on the behalf of the staff at KAL and also on the behalf of the customers involved in the swimming lessons. Any system that is created will need to integrate several currently loosely related systems; the enrolment; the badges/certificates; the finance and the schedule/lesson creation systems. The project has to make use of current technology and systems available as there is no budget available.

### **Development of Problem Situation**

The general problems, as identified in my interview with the duty manager, with the current way of working are as follows:

*Lack of storage space* - this has been caused by the recent merger with the private health club that is situated in the same complex. The merge has initiated a re-organisation of staff and building layouts which have resulted in the reception space being halved to allow for the leisure centre and the health club to co-work in the same reception. Although the reception is now half the size the number of documents needed to be stored has remained the same.

*Documents getting lost or misplaced* - when considering the personal details that these documents hold this is not appreciated by the customers or the management. Additionally, these documents also hold details such as receipt numbers which are occasionally required as part of a mini-audit.

*Work is unprofessional* - all work is hand written, which means that details can sometimes be 'scribbled' in an unreadable fashion resulting in problems later on such as being unable to read the details. The documents can also get very chaotic and confused due to crossing outs and corrections.

*Inefficiency (type 1)*– the swimming lessons work on a thirteen week cycle and after each cycle customers are required to re-enrol (either into a new class if they have moved up a grade or if they wish to be in a class with a different teacher). This means that each enrolment a large percentage of the customers are current customers, meaning that KAL already have their details. Due to the hand written nature of the current processes there is no provision that would allow KAL to re-cycle the customer details. This means that all current customers' details need to be manually copied onto the new enrolment sheets. This is time consuming and mundane.

*Inefficiency (type 2)* – once the enrolment is complete, senior management require some statistics and balance sheets on the process. These include such things as the percentage of the capacity each class has i.e. if a class has a capacity of twelve then it management want to know if the class is full and also the financial statistics that correlate with the classes. These statistics are required for each individual class, each grade and for each day as it can highlight the high and low demand classes, grades and days. With the current system it is one person's job to sift through all the enrolment documents to obtain statistics in order to create such statistical documents. Again this is time consuming and mundane and could easily be automated within a system.

*Administration errors* – when enrolling a customer onto any lessons it is vital that the receipt number from the transaction is recorded with the relevant customer details. This is used as payment verification and also as an audit in the future. Receptionists are currently occasionally forgetting to do this which causes many problems further down the line. A computerised system would enable functionality such as adding necessary checks to ensure all mandatory data is collected.

*Badges and Certificates* – the current system for these is that if a child qualifies for a badge or certificate their teacher will give them a card which they authorise. The child can then take the card to reception and pay for the relevant badge and/or certificate. The receptionist can then print the child's details onto the certificate (if the relevant certificate is in stock) and it then goes into a folder, waiting for the teacher to sign the certificate. The child then has to collect the certificate the week after. The problems with this system is that there is often confusion as to whether a customer has paid for a certificate due to there being no function of recording whether they have paid or not. There can also be confusion in regards to whether the certificate has been printed or not. A simple feature such as certificate stage recording could be added to a system in order to explicitly state the stage of the certificate. Although it may appear a minor area of the system, the badges and certificates are a high priority due to their importance to the child who has achieved the award and unhappy children create unhappy parents, therefore you have unhappy customers.

### **Process Problems**

To ensure ALL existing problems and any potential problems are identified it is necessary to examine each business process (as identified in the chapter 3) individually. In addition to identifying the problem it is also wise to consider the impacts of the problem when the problem occurs.

### **Document Problems**

As stated within the process problems table, a major problem within the enrolment situation is the recording of data. This is done using the specified documents detailed in the analysis report. The related problems are explained below:

<b>Problem</b>	<b>Impacts</b>
Information duplicated	It has been known for a child to be accidentally booked into two different classes. This then means that other customers cannot have this space. It also causes confusion when it comes to deciding which the correct class is.
Documents are handwritten	As previously mentioned, the fact that the whole system is hand written leads to problems of understanding other peoples handwriting, crossing outs and also spelling mistakes. It also makes the documents look unprofessional.
No backups	Dependant upon which stage the enrolment process is at but this can have serious impacts if a document is lost. It can cause major problems with assigning customers to classes and also there are data protection issues.

Time consuming	Once the enrolment process is complete it is necessary to directly copy the information on the booking sheets onto the new registers which is both time consuming and inefficient.
Inefficient e.g. when copying information from document to document	As above
Mandatory details are not always obtained	As mentioned previously, not all details are obtained from customers when they should be. The main detail being missed is the receipt number.
Filing	Due to all work being paper based it is necessary to file all documents. The previous cycle of swimming lessons is usually held in reception so that staff can refer to the old registers/booking sheets. Older documents are stored in filing cabinets that are held in a separate office. These documents must be held for three years.

It is now possible to create a clear concise problem statement by evaluating the above problems:

Kirklees Active Leisure has several problems with their current swimming enrolment system and the management of the swimming lessons. The problem can be split up into the data integrity issues, professionalism and efficiency. The data integrity is often questioned due to duplications and simple human errors such as forgetting to collect mandatory data. The professionalism problem relates to the fact that the system is all manual and hand written, which creates the problem of data integrity and tidiness of work. Finally, the efficiency relates to the need to copy documents such as copying the booking sheets to create the registers and also copying the booking sheets to create new tidy, readable ones.

**Project Specification – see section 4.2**

**Tried Solution – see section 4.3**

**Potential Solutions – see section 4.4**

**Other Issues to be addressed – see section 4.5**

**Chosen Solution – see section 4.6**

## **Conclusion**

Through this report I have identified general and specific problems with the current system and also the requirements of any proposed system, thus creating a general aim for the project. This report has also considered how to implement any proposed solutions and I feel the most suitable method has been chosen. I must now focus on designing a system that meets the requirements and is possible to implement through my chosen method. Once this design has been completed I will proceed in creating a prototype to that will be accepted by the users.



## Appendix H Potential Solution Feasibility

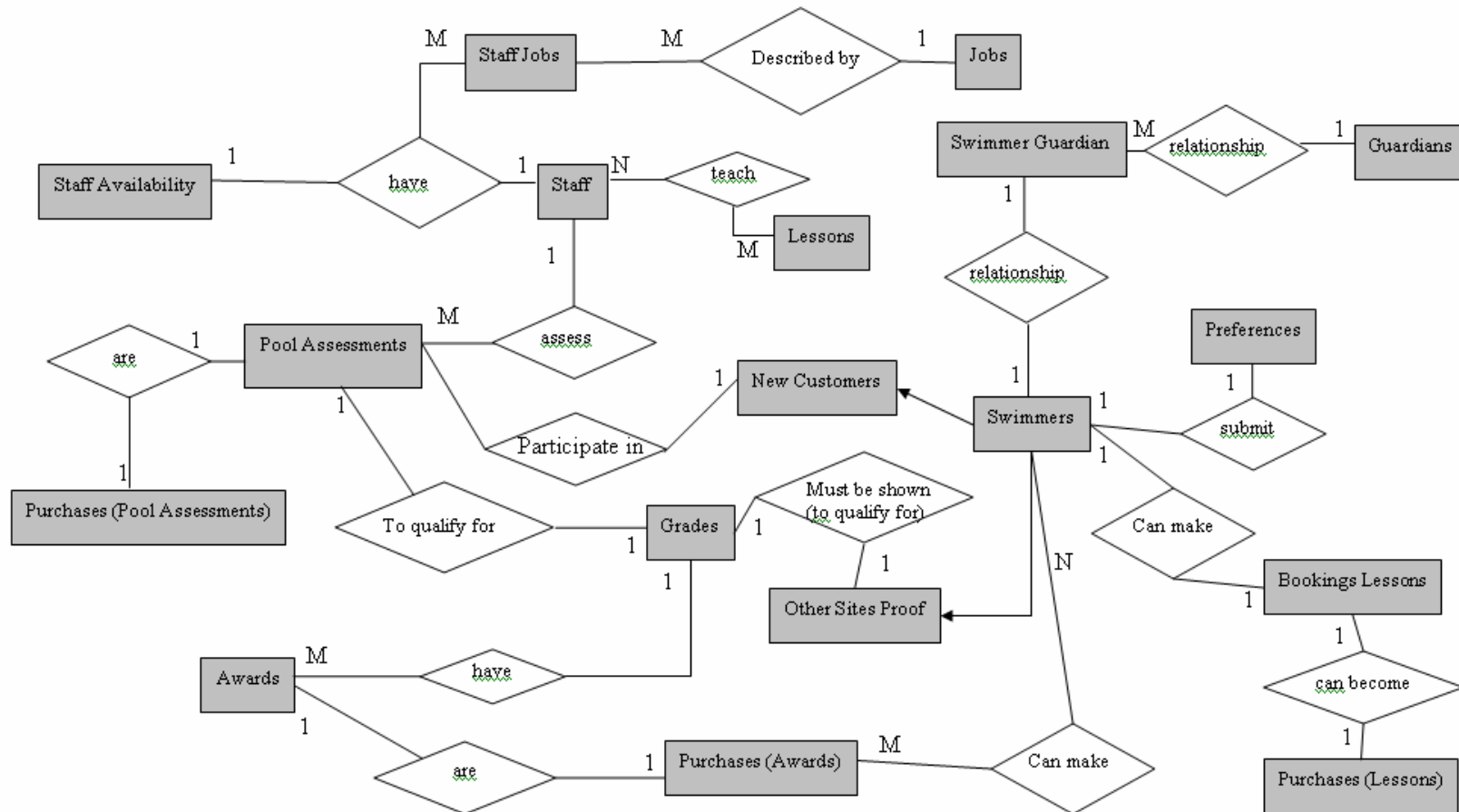
Application of TELOS for the Feasibility Study

	Technical	Economical	Legal	Organisational	Schedule
<b>Microsoft Access Database</b>	<b>Feasible:</b> existing software & very common in the workplace. Developer has excellent knowledge of the package.	<b>Feasible:</b> organisation already owns the package so no purchase costs; only cost is for user centred development time.	<b>Feasible:</b> due to already owning the package no licenses needed. Data security needed to ensure compliance with Data Protection Act.	<b>Feasible:</b> not too complex therefore IT illiterate will accept the system. Maintainability possible due to certain members of staffs' knowledge of the package.	<b>Feasible:</b> Schedule possible and realistic.
<b>Web-based Database</b>	<b>Feasible:</b> developer has sufficient knowledge, internet connection in close proximity.	<b>Maybe:</b> internet currently not in the reception area, so extension to Internet needed	<b>Feasible:</b> data security a major issue – especially if sensitive data is being transmitted. Data protection act very relevant.	<b>Not feasible:</b> fairly complex and may be a lack of understanding from staff.	<b>Maybe:</b> due to less knowledge of the development option the schedule may be pushed.
<b>Microsoft SQL Server Database</b>	<b>Feasible:</b> developer has sufficient knowledge, hardware and software available.	<b>Not Feasible:</b> Server costs would be unacceptable.	<b>Feasible:</b> Data security needed to ensure compliance with Data Protection Act.	<b>Not Feasible:</b> the perceived complexity of the system may decrease user acceptance and also maintainability will not be possible.	<b>Maybe:</b> due to less knowledge of the development option the schedule may be pushed.

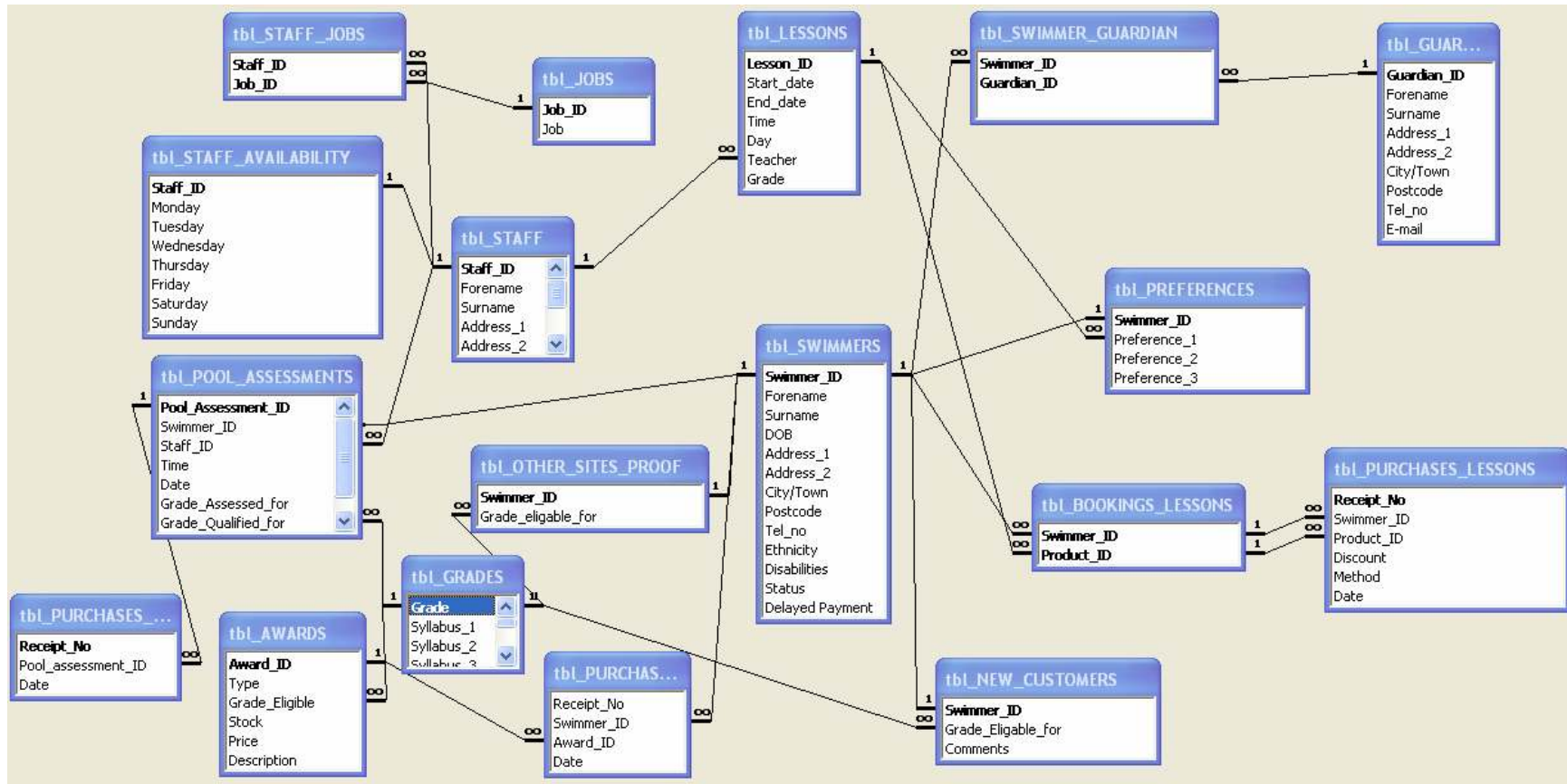
	Technical	Economical	Legal	Organisational	Schedule
<b>Swipe Card Integrated Database</b>	<b>Not Feasible:</b> Existing hardware available (due to merger with the health club) but knowledge of the software to integrate a database is non-existent.	<b>Not Feasible:</b> the software needed for the integration may be expensive and unacceptable.	<b>Feasible:</b> Data security needed to ensure compliance with Data Protection Act.	<b>Feasible:</b> management would welcome the change and dependant upon the database integrated user acceptance and maintainability could be feasible.	<b>Maybe:</b> Schedule unknown and dependant upon how complex the integration is.

## Appendix I E-R Diagram

The E-R diagram below shows the eighteen tables and the relationships between each. Each relationship is also detailed as to whether it is one to many (1:M), one to one (1:1) or many to many (M:N).



Below is the screen print of the tables, attributes and relationships once they had been created in the Access database. This is the stage where the referential integrity – cascade update and cascade delete, was added (where relevant).



## Appendix J Data Dictionary

Below is the data dictionary that was created to aid the design of the tables. It is also a valuable tool when it comes to any maintenance as it is documentation of exactly what the tables hold and how they are formatted.

Attribute	Data Type	Field Size	Input Mask	Default Value	Look Values	Up	Validation Rule	Mandatory
<b>AWARDS</b>								
<b>Award_ID</b>	Auto number	6	-	-	-		-	Yes
Type	Text	20	-	-	Badge;"Certificate";"Medal"		Restricted to look up table	
Grade_eligible	Text	20	-	-	GRADES.Grade_ID		Restricted to look up table	
Stock	Number	2	-	0	-		<= 0	
Price	Currency	-	£0.00	£0.00	-		Between 0 And 5	
Description	Text	250						
<b>BOOKINGS LESSONS</b>								
<b>Swimmer_ID</b>	Auto number	6	-	-	SWIMMERS.Swimmer_ID		Restricted to look up table	Yes
<b>Product_ID</b>	Auto number	6	-	-	LESSONS.Lesson_ID		Restricted to look up table	
<b>GRADES</b>								
<b>Grade</b>	Text	20	-	-				Yes
Syllabus_1	Text	255						
Syllabus_2	Text	255						
Syllabus_3	Text	255						
Syllabus_4	Text	255						
Syllabus_5	Text	255						
Syllabus_6	Text	255						
Syllabus_7	Text	255						

Syllabus_8	Text	255					
<b>GUARDIANS</b>							
<b>Guardian_ID</b>	Auto number	6					Yes
Forename	Text	30					
Surname	Text	30					
Address_1	Text	50					
Address_2	Text	50					
City/Town	Text	30		Hudds			
Post_Code	Text	8				format: > (upper case)	
Tel_No	Integer	11					
Email	text	150				Contains "*@*"	
<b>JOBS</b>							
<b>Job_ID</b>	Auto number	6					Yes
Job_desc	Text	100			Duty manager; Acting Up Receptionist - contracted Receptionist - casual Lifeguard - contract Lifeguard - casual	Restricted to look up table	
Qualifications	Text	255					
<b>LESSONS</b>							
<b>Lesson_ID</b>	Auto number	6					Yes
Start_Date	Date/Time	10	/ /				
End_Date	Date/Time	10	/ /			>Start_Date	
Time	Date/Time	5	:				
Day	Text	9			Monday;"Tuesday"; "Wednesday";"Thursday"; "Friday";"Saturday"	Restricted to look up table	
Teacher	Text				STAFF.Staff_ID	Restricted to look up table	
Grade	Text	20			GRADES.Grade_ID	Restricted to look up table	

<b>LESSON HISTORY</b>							
Swimmer_ID	Auto number	6			SWIMMERS.Swimmer_ID	Restricted to look up table	Yes
Lesson_ID	Auto number	6			LESSONS.Lesson_ID	Restricted to look up table	Yes
<b>NEW CUSTOMERS</b>							
Swimmer_ID	Number				SWIMMERS.Swimmer_ID	Restricted to look up table	Yes
Grade_eligible_for	Text				GRADES.Grade_ID	Restricted to look up table	
Comments	Text	255					
<b>OTHER SITES PROOF</b>							
Swimmer_ID	Number				SWIMMERS.Swimmer_ID	Restricted to look up table	Yes
Grade_eligible_for	Text				GRADES.Grade_ID	Restricted to look up table	
<b>POOL ASSESSMENTS</b>							
Pool_assessment_ID	Autonumber						Yes
Swimmer_ID	Number				SWIMMERS.Swimmer_ID	Restricted to look up table	
Teacher	Number				STAFF.Staff_ID	=STAFF_JOBS_Staff_ID and STAFF_JOBS.Job_ID = "07"	
Time	Date/Time	10	__ / __ / __				
Date	Date/Time	5	__ : __			>=Date()	
Grade Assessed for	Text				GRADES.Grade_ID	Restricted to look up table	
Grade_Eligible_for	Text				GRADES.Grade_ID	Restricted to look up table	
Comments	Text	255					
<b>PREFERENCES</b>							
Swimmer_ID	Number						Yes
Preference_1	Number					Where Preference_1>=Previous Grade	Yes
Preference_2	Number					Where Preference_2>=Previous Grade	Yes
Preference_3	Number					Where Preference_3>=Previous Grade	Yes
<b>PURCHASES_AWARDS</b>							
Receipt_No	Text	10					Yes
Swimmer_ID	Number				SWIMMERS.Swimmer_ID	Restricted to look up table	
Award_ID	Number		£0.00	£0.00	AWARDS.Award_ID	Restricted to look up table	
Date	Date/Time				Cash, Cheque, Debit Card, Credit Card	Restricted to look up table	

PURCHASES LESSONS							
Receipt_No	Text	10					Yes
Swimmer_ID	Number				SWIMMERS.Swimmer_ID	Restricted to look up table	
Product_ID	Text				LESSONS.Lesson_ID	Restricted to look up table	
Discount	Text	20		None	None; Kirklees Passport	Restricted to look up table	
Method	Text	10			Cash, Cheque, Debit Card, Credit Card	Restricted to look up table	
Date	Date/Time			=Date()		Field is locked.	
PURCHASES POOL ASSESSMENTS							
Receipt_No	Text	10					Yes
Pool_assessment_ID	Text						
Date	Date/Time			=Date()		Field is locked.	
STAFF							
Staff_ID	Auto number	6					Yes
Forename	Text	30					
Surname	Text	30					
Address_1	Text	50					
Address_2	Text	50					
City/Town	Text	30					
Post_Code	Text	8				format: > (upper case)	
E-mail	text	150				Contains "**@*"	
Tel_No	Integer	11					
STAFF AVAILABILITY							
Staff_ID	Auto number	6					Yes
Monday	Text				No;Yes - am;Yes - pm;Yes - all day;Maybe		
Tuesday	Text				No;Yes - am;Yes - pm;Yes - all day;Maybe		
Wednesday	Text				No;Yes - am;Yes - pm;Yes - all day;Maybe		



Thursday	Text				No;Yes - am;Yes - pm;Yes - all day;Maybe		
Friday	Text				No;Yes - am;Yes - pm;Yes - all day;Maybe		
Saturday	Text				No;Yes - am;Yes - pm;Yes - all day;Maybe		
Sunday	Text				No;Yes - am;Yes - pm;Yes - all day;Maybe		
<b>STAFF_JOBS</b>							
Staff_ID	Auto number				STAFF.Staff_ID		Yes
Job_ID	Auto number				JOBS.Job_ID		Yes
<b>SWIMMERS</b>							
Swimmer_ID	Autonumber		-	-		Autonumber - validation not needed.	Yes
Forename	Text	30					
Surname	Text	40					
DOB	Date/Time		" / / "				
Address_1	Text	50					
Address_2	Text	50					
City/Town	Text	25		Hudds		Format: > (Uppercase)	
Post_Code	Text	7					
Tel_No	Integer	11					
Ethnicity	Text						
Disabilites	Text			None			
Status	Text				Staying;"Staying>Moving"; "Moving";"Other site";"New Customer";"Not Interested"	Restricted to look up	
Delayed Payment	Date/Time		" / / "			>Date()	
<b>SWIMMER_GUARDIAN</b>							
Swimmer_ID	Autonumber						Yes
Guardian_ID	Autonumber						Yes

## Appendix K Normalization

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Before normalisation was applied the database was as shown below. This would have created a database with redundancy and other problems related to efficiency. Due to the amount of data the database will hold these inefficiency problems would have made the database almost unworkable.

Before normalization:

**SWIMMERS** (Swimmer\_ID, Forename, Surname, DOB, Address\_1, Address\_2, City/Town, Post\_Code, Tel\_No, Ethnicity, Disabilites, Status, Delayed Payment, Guardian\_Forename, Guardian\_Surname, Guardian\_Address\_1, Guardian\_Address\_2, Guardian\_City/Town, Guardian\_Post\_Code, Guardian\_Tel\_No, Guardian\_Email, Lesson\_Start\_Date, Lesson\_End\_Date, Lesson\_Time, Lesson\_Day, Lesson\_Teacher, Lesson\_Grade, Preference\_1, Preference\_2, Preference\_3, Pool\_assessment\_Teacher, Pool\_assessment\_Time, Pool\_assessment\_Date, Pool\_assessment\_Grade\_Assessed\_for, Pool\_assessment\_Grade\_Eligible\_for, Pool\_assessment\_Comments)

**PURCHASES** (Receipt\_No, Swimmer\_ID, Date)

**AWARDS** (Award\_ID, Type, Grade\_eligible, Stock, Price, Description)

**STAFF** (Staff\_ID, Forename, Surname, ddress\_1, Address\_2, City/Town, Post\_Code, E-mail, Tel\_No, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, Jobs, Qualifications)

Then, once the normalization process was applied the following tables were produced:

**AWARDS** (Award\_ID, Type, Grade\_eligible, Stock, Price, Description)

**BOOKINGS\_LESSONS** (Swimmer\_ID, Product\_ID)

**GRADES** (Grade, Syllabus\_1, Syllabus\_2, Syllabus\_3, Syllabus\_4, Syllabus\_5, Syllabus\_6, Syllabus\_7, Syllabus\_8)

**GUARDIANS** (Guardian\_ID, Forename, Surname, Address\_1, Address\_2, City/Town, Post\_Code, Tel\_No, Email)

**JOBS** (Job\_ID, Job\_desc , Qualifications)

**LESSONS** (Lesson\_ID, Start\_Date, End\_Date, Time, Day, Teacher, Grade)

**LESSON\_HISTORY** (Swimmer\_ID, Lesson\_ID)

**NEW CUSTOMERS** (Swimmer\_ID, Grade\_eligible\_for, Comments)

**OTHER\_SITES\_PROOF** (Swimmer\_ID, Grade\_eligible\_for)

**POOL\_ASSESSMENTS** (Pool\_assessment\_ID, Swimmer\_ID, Teacher, Time, Date,  
Grade\_Assessed\_for, Grade\_Eligible\_for, Comments)

**PREFERENCES** (Swimmer\_ID, Preference\_1, Preference\_2, Preference\_3)

**PURCHASES\_AWARDS** (Receipt\_No, Swimmer\_ID, Award\_ID, Date)

**PURCHASES\_LESSONS** (Receipt\_No, Swimmer\_ID, Product\_ID, Discount, Method, Date)

**PURCHASES\_POOL\_ASSESSMENTS** (Receipt\_No, Pool\_assessment\_ID, Date)

**STAFF** (Staff\_ID, Forename, Surname, Address\_1, Address\_2, City/Town, Post\_Code, E-mail,  
Tel\_No)

**STAFF\_AVAILABILITY** (Staff\_ID, Monday, Tuesday, Wednesday, Thursday, Friday,  
Saturday, Sunday)

**STAFF\_JOBS** (Staff\_ID, Job\_ID)

**SWIMMERS** (Swimmer\_ID, Forename, Surname, DOB, Address\_1, Address\_2, City/Town,  
Post\_Code, Tel\_No, Ethnicity, Disabilites, Status, Delayed Payment)

**SWIMMER\_GUARDIAN** (Swimmer\_ID, Guardian\_ID)

## Appendix L Potential Interface Designs

The following are proposed designs that were discussed in a workshop with several members of staff. Although the designs are from a very high level they all include the generic features that are outlined in the design guidelines in section 5.11. This means that no matter which design is chosen they will all have the capability of reversible actions either via an undo button or via another means e.g. undo a new swimmer by deleting them. All designs will have appropriately worded system messages (and appropriate use of these messages, in that they will only be used where it is necessary). The designs will also make use of feedback to ensure the user is aware what the system is doing. Additionally, the system will be able to reduce the rate of errors through the use of such things as drop down menus, restricted selections and also validation.

Overall, the main purpose of this exercise was to follow the principle of involving the user in the design as much as possible. This helps the user create a mental image of the system thus creating a sense of familiarity once the system is introduced.

### Design 1

KIRKLEES ACTIVE LEISURE

List of everyone - either drop down list or visible list.

aaaa aaaaaa  
bbbb bbbbb  
cccc cccc  
dddd dddd  
eeee eeeee  
ffff ffffff  
gggg gggggg  
hhhh hhhhhh...

Specific details for the selected record...

PERSONAL DETAILS

cccc ccccc 53 KJGHKJG Road  
09/09/1999 JHGGsdfg  
07758595764653 dfssdfsd  
HD3 0KL

LESSON DETAILS

Grade 1 Teacher 1  
09:00 - 09:30

AWARD DETAILS

Badge 4  
£1.85

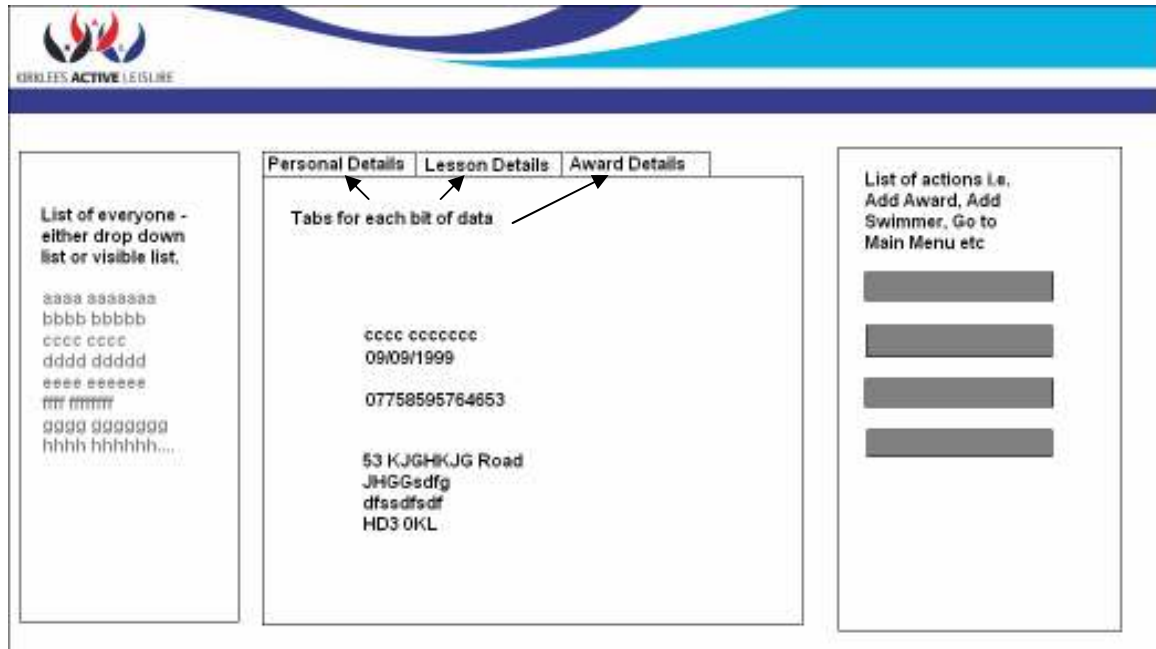
List of actions i.e.  
Add Award, Add  
Swimmer, Go to  
Main Menu etc

[Button]  
[Button]  
[Button]  
[Button]

This design is a very attractive possibility. It is very good at focusing the user's attention due to the boundary boxes grouping 'like' attributes. Although, the use of space may be

almost too good, as dependant upon the size of the data entry boxes the interface may seem very crowded. The list on the left will be a great aid for human memory loss.

## Design 2



This design has the same advantages as the previous design – and it also combats the issue of the interface being too crowded by the use of tabs. Although, this may also be regarded as a flaw as it is not great for human memory loss and also it may be regarded as being ‘awkward’ for traversing between the tabs.

### Design 3

KIRKLEES ACTIVE LEISURE

SEARCH SWIMMERS:

**PERSONAL DETAILS**

Mark Hopkinson  
09/09/1999  
07758595764653  
53 KJGHHKJG Road  
JHGGsdfg  
dfesdfsdf  
HD3 0KL

**LESSON DETAILS**

Grade 5  
12:00  
Saturday  
Philip Morrison  
Moving

List of actions i.e.  
Add Award, Add  
Swimmer, Go to  
Main Menu etc

This design adds functionality by using a search box instead of a list. This is better use of space as it is only possible to deal with one record at once; therefore a list is not really needed. It also incorporates the advantageous design features of the other designs.

It was decided that design 3 would be utilised due to the main issue of the screen being very clear thus aiding usability. It works with cognitive thinking, it has clear data grouping to aid where attention should be focused and it is relatively simple, thus, increasing the chances of user acceptance.

## **Appendix M Query Design**

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### **Key System Areas**

It was decided for this project that the general areas of the system would be; the people area split into several different sections (swimmers, guardians and staff); the Enrolment area – split into the four main areas (staying, moving, other sites and new customers); the awards area; the management area relating to the lessons and the finance.

### **Query Design**

Once it was determined that the above main forms were required, it was then possible to design the queries. This was done by writing down, in English, what was required then from this it was possible to either convert the English into SQL or build the query via the MS Access wizard. Each form required the following key queries:

(NOTE: each query detailed below may have taken just one real query in order to get the data but it is more likely that a series of several queries was produced as it was not always possible to perform all the necessary actions within one query.)

### **Main Menu**

N/a – only visual basic needed.

### **Swimmers**

- Current Lessons - select all lesson details for each lesson a swimmer is enrolled on where the start date is before today and the end date is in the future or is today.
- Future Lessons - select all lesson details for each lesson a swimmer is enrolled on where the start date and end dates are in the future.
- Next Grade – For all swimmers, their next grade, if they are staying swimmers, will be the same grade as currently, the same is the case if they are Staying>moving swimmers (i.e. staying but want a different class), else if they are moving the next\_grade will be their current grade plus 1, with the exception of water confidence, in which case the grade will be '1' and grade 5 is an exception will change to 'Medals'

### **Guardians**

- Dependants – Select Swimmer details where swimmer and guardian have a relationship.

## **Staff**

- N/a – only visual basic needed.

## **Staying Swimmers**

- Select all swimmers where status is Staying.
- Assign Staying customers – Add staying swimmers to future lesson where future lesson time, grade, teacher, day are same as current lesson time, grade, teacher, day.
- Complete Staying customers – Update non paying staying swimmers status to Not Interested.
- Delete Non Payers – Delete Staying Customers from Lesson Purchases if they have not paid unless a Delayed Payment has been agreed.

## **Moving Swimmers**

- Select all swimmers where status is Moving.
- Current Lessons - select all lesson details for each lesson a swimmer is enrolled on where the start date is before today and the end date is in the future or is today.
- Future Lessons - select all lesson details for the lesson the swimmer is enrolled on where the start date and end dates are in the future.
- Siblings –
- Match the swimmer with a guardian and show any other dependants this guardian is related to.
- Show the lesson details (if assigned to a lesson) of these siblings.
- Preferences – for each swimmer show available lessons where available\_lessons\_grade equals next\_grade
- Assign Moving customers – Add moving swimmers to a future lesson where future lesson ID is equal to either preference 1, 2 or 3 and future lesson availability is greater than 0.
- Complete Staying customers – Update non paying moving swimmers status to Not Interested.
- Delete Non Payers – Delete Moving Customers from Lesson Purchases if they have not paid unless a Delayed Payment has been agreed.

## **Other Sites Swimmers**

- Select all swimmers where status is Other Sites.



- Lesson Availability - for each swimmer show the available lessons where available\_lessons\_grade equals Grade\_eligible\_for and where availability is greater than 0.
- Add to Lesson – Add swimmer to the selected lesson.
- Future Lessons - select the lesson details for the lesson the swimmer is enrolled on where the start date and end dates are in the future.

### **New Customer**

- Select all swimmers where status is new customer.
- Lesson Availability - for each swimmer show the available lessons where available\_lessons\_grade equals Grade\_eligible\_for and where availability is greater than 0.
- Add to Lesson – Add swimmer to the selected lesson.
- Future Lessons - select the lesson details for the lesson the swimmer is enrolled on where the start date and end dates are in the future.

### **Awards**

- N/a – only visual basic needed.

### **Lessons**

- Current Lessons - select all lesson details where the start date is before today and the end date is in the future or is today.
- Enrolled Swimmers – Select Swimmer details where swimmer has paid for the lesson.
- Add New Lesson Course – Add new Lessons where day, time, grade and teacher are equal to current lessons and add 91 to both start\_date and end\_date.
- To show the Lesson Availability Report – For each lesson\_ID count the number of occurrences within the payments table then if the grade is Water Confidence subtract this number from 10, else if the grade 1 to 5 subtract this number from 12.

The above queries are shown within the system here:













































Create query in Design view	qry_Guardian_Names	qry_paid_purchases3	qry_Siblings_none
Create query by using wizard	qry_lessons_1	qry_Paid_receipt_number1	qry_start_jobs
qry_add_pool_assessment_payment	qry_lessons_2	qry_Paid_receipt_number2	qry_STAYTHS_Lesson_Slips
qry_Add_To_Lesson_new_customers	qry_lessons_3	qry_Pool_assessment_status	qry_STAYTHS_Lesson_Slips_Individual
qry_Add_To_Lesson_other_site	qry_lessons_4	qry_Preferences_Submitted	qry_Swimmers_in_a_class
qry_Add_To_Preference_1	qry_lessons_5	qry_registers01	qry_Swimmers_in_a_class2
qry_Add_To_Preference_2	qry_lessons_for_slips	qry_registers02	qry_Swimmers_in_a_class_with_count
qry_Add_To_Preference_3	qry_lessons_vic	qry_registers03	qry_Swimmers_Moving
qry_Assign_Staying_Customers	qry_lessons_with_full_availability	qry_registers04	qry_Swimmers_Others
qry_Awards_eligible_for	qry_Lesson_availability	qry_registers05	qry_Swimmers_Staying
qry_Awards_eligible_for2	qry_Lesson_availability2	qry_registers06	qry_Swimmer_Names
qry_control_stock	qry_Lesson_count	qry_registers07	qry_union_registers
qry_CountOfSwimmer_to_Guardian	qry_Lesson_Details	qry_registers08	qry_Update_delayed_payment_field
qry_CountOfSwimmer_to_Guardian1	qry_Lesson_purchases1	qry_registers09	qry_Update_Moving_Swimmer_Status
qry_Current_Swimmers_Lessons	qry_Lesson_purchases2	qry_registers10	qry_Update_Staying_Swimmer_Status
qry_Delete_non_paying_customers	qry_Lesson_Slips_status	qry_registers11	
qry_delete_paid_no_receipt_record	qry_Link_Term_for_payments	qry_registers12	
qry_delete_paid_no_receipt_record1	qry_Moving_Lesson_Slips	qry_registers_all	
qry_delete_paid_no_receipt_record2	qry_Moving_Lesson_Slips_Individual	qry_registers_specific	
qry_Double_booked_Lessons	qry_Moving_swimmers_receipt_no	qry_Reset_Swimmer_Status	
qry_Double_booked_Lessons2	qry_New_Customers_status	qry_Show_Add_to_preference_1	
qry_Future_Lessons	qry_New_Lesson_Plan	qry_Show_Add_to_preference_2	
qry_Future_Lesson_assigned_paid	qry_Next_grade	qry_Show_Add_to_preference_3	
qry_Future_Lesson_assigned_paid1	qry_Other_sites_Grade_eligible	qry_Siblings1	
qry_Future_Lesson_assigned_paid2	qry_Other_site_lesson_link	qry_Siblings2	
qry_Future_Lesson_assigned_paid3	qry_Other_site_lesson_link1	qry_Siblings3	
qry_Future_Lesson_status	qry_paid_purchases1	qry_Siblings4	
qry_Future_Swimmers_Lessons	qry_paid_purchases2	qry_Siblings5	

## Lesson Management/Finances

- To show the Lesson Finances Day by Day Report –
  - INCOME - Group all lesson purchases by day and count the number of swimmers with no discount and the number of swimmers with Kirklees Passport discount. Multiply the no discount swimmers by normal price and the Kirklees Passport discount swimmers by the discount price.
  - OUT GOINGS – calculate the length of each lesson and work out the cost of running the lesson based on the hourly rate. Add these together grouped by each day.
  - PROFITS – Incomings minus Out goings.
- To show the Lesson Finances Grade by Grade Monday Report
  - INCOME - Group all Monday lesson purchases by grade and count the number of swimmers with no discount and the number of swimmers with Kirklees Passport discount. Multiply the no discount swimmers by normal price and the Kirklees Passport discount swimmers by the discount price.
  - OUT GOINGS – calculate the length of the lesson and work out the cost of running the lesson based on the hourly rate.
  - PROFITS – Incomings minus Out goings.

- To show the Lesson Finances Grade by Grade Tuesday Report – as above but for Tuesday.
- To show the Lesson Finances Grade by Grade Wednesday Report – as above but for Wednesday.
- To show the Lesson Finances Grade by Grade Thursday Report – as above but for Thursday.
- To show the Lesson Finances Grade by Grade Friday Report – as above but for Friday.
- To show the Lesson Finances Grade by Grade Saturday Report – as above but for Saturday.

The above management queries are shown here:

 Create query in Design view	 qry_MGT_actual_income_thur2	 qry_MGT_DATA_SET_Wed
 Create query by using wizard	 qry_MGT_actual_income_thur3	 qry_MGT_Max_no_of_swimmers_per_day
 qry_MGT_actual_income	 qry_MGT_actual_income_tues1	 qry_MGT_Max_no_of_swimmers_per_day2
 qry_MGT_actual_income2	 qry_MGT_actual_income_tues2	 qry_MGT_Max_no_of_swimmers_per_day3
 qry_MGT_actual_income3	 qry_MGT_actual_income_tues3	 qry_MGT_no_of_lessons_per_day
 qry_MGT_actual_income_fri1	 qry_MGT_actual_income_wed1	 qry_MGT_no_of_lessons_per_day2
 qry_MGT_actual_income_fri2	 qry_MGT_actual_income_wed2	 qry_MGT_no_of_lessons_per_day3
 qry_MGT_actual_income_fri3	 qry_MGT_actual_income_wed3	 qry_MGT_no_of_swimmers_per_day
 qry_MGT_actual_income_mon1	 qry_MGT_DATA_SET_1	 qry_MGT_no_of_swimmers_per_day_Fri
 qry_MGT_actual_income_mon2	 qry_MGT_DATA_SET_1_TOTALS	 qry_MGT_no_of_swimmers_per_day_Mon
 qry_MGT_actual_income_mon3	 qry_MGT_DATA_SET_Fri	 qry_MGT_no_of_swimmers_per_day_Sat
 qry_MGT_actual_income_sat1	 qry_MGT_DATA_SET_Mon	 qry_MGT_no_of_swimmers_per_day_Thurs
 qry_MGT_actual_income_sat2	 qry_MGT_DATA_SET_Sat	 qry_MGT_no_of_swimmers_per_day_Tues
 qry_MGT_actual_income_sat3	 qry_MGT_DATA_SET_Thur	 qry_MGT_no_of_swimmers_per_day_Wed
 qry_MGT_actual_income_thur1	 qry_MGT_DATA_SET_Tues	

## Appendix N Visual Basic Code

Each form that was implemented made use of subforms and navigation between records within the form itself and between the different forms with the system. To add functionality and to increase usability visual basic was used to govern the form. Some sample extracts of code can be seen below.

The SWIMMERS Form:

The screenshot shows a complex form titled "Kirkles Active Leisure Swimming Lesson Enrolment and Management System - [Form: SWIMMERS : Form]". It is divided into several sections:

- Personal Details:** Includes fields for Swimmer\_ID, Forename, Surname, DOB, Address, City/Town, Postcode, Tel\_no, Ethnicity, Disabilities, and Delayed Payment. A callout box points to the search area, stating: "Ensures the search finds these details. Code 1".
- Current Lesson Details:** Includes fields for Start\_date, End\_date, Time, Day, Grade, and Teacher\_Name. A callout box points to the "Staying" status dropdown, stating: "Staying".
- Future Lesson Details:** Includes fields for Lesson\_ID, Start\_date, End\_date, Time, Day, Grade, and Teacher\_Name.
- Pool Assessments:** A section with a callout box stating: "Pool assessments section controlled by code 4".
- Payments:** Includes fields for Discount, Method, Date, and Receipt\_No. A callout box points to the "Method" dropdown, stating: "Payment possible due to code 5".
- Actions:** Includes buttons for "Print Lesson Slip", "Add an Award", and "Reset All Swimmer Status". A callout box points to the "Print Lesson Slip" button, stating: "Print lesson slip controlled by code 8".

### CODE 1

```
Private Sub Combo12_AfterUpdate()
```

```
Dim rs As Object
```

```
Set rs = Me.Recordset.Clone
```

```
rs.FindFirst "[Swimmer_ID] = " & Str(Nz(Me![Combo12], 0))
```

```
If Not rs.EOF Then Me.Bookmark = rs.Bookmark
```

The above matches the record selected within the combo/search box to the specific details shown on the Personal details section. This enables the user to search for any swimmer and then see their respective details.

## CODE 2

```
If Text29 = "New Customer" Then
    [subfrm_Current_Swimmers_Lessons].SourceObject = "frm_No_history_message"
ElseIf Text29 = "Other Site" Then
    [subfrm_Current_Swimmers_Lessons].SourceObject = "frm_Add_other_site_grade_eligibility"
ElseIf Text29 = "Staying" Then
    [subfrm_Current_Swimmers_Lessons].SourceObject = "frm_Current_Swimmers_Lessons"
ElseIf Text29 = "Staying>moving" Then
    [subfrm_Current_Swimmers_Lessons].SourceObject = "frm_Current_Swimmers_Lessons"
ElseIf Text29 = "Moving" Then
    [subfrm_Current_Swimmers_Lessons].SourceObject = "frm_Current_Swimmers_Lessons"
ElseIf Text29 = "Not interested" Then
    [subfrm_Current_Swimmers_Lessons].SourceObject = "frm_Current_Swimmers_Lessons"
End If
```

The above is an IF statement that controls which subforms will be shown. It uses the swimmer status as shown in 'TEXT29' as the control source. This is required because if a swimmer is a new customer they will not have any current lesson details, therefore the current lesson details subform is not needed. This keeps the form looking un-cluttered and ensures the users focus of attention is in the correct area.

## CODE 3

```
If Text29 = "Not interested" Then
    [subfrm_Future_swimmers_Lessons].SourceObject = "frm_Not_interested"
ElseIf Text29 <> "Not Interested" And Text26 = "assigned" Then
    [subfrm_Future_swimmers_Lessons].SourceObject = "frm_Future_Swimmers_Lessons"
ElseIf Text29 <> "Not Interested" And Text26 = "Not yet assigned" Then
    [subfrm_Future_swimmers_Lessons].SourceObject = "frm_Future_lesson_Status"
End If
```

The above works on a similar basis to the previous code, but this time the IF statement controls whether the future lesson details are shown. Again this is to aid the usability of the system.

#### **CODE 4**

```
If Text34 = "Not needed" Then
    [Open Pool Assessment form].Visible = False
    [subfrm_Pool_Assessment_result].SourceObject = "frm_blank"
ElseIf Text34 = "complete" Then
    [Open Pool Assessment form].Visible = False
    [subfrm_Pool_Assessment_result].SourceObject = "frm_Pool_Assessment_result"
ElseIf Text34 = "incomplete" Then
    [Open Pool Assessment form].Visible = True
    [subfrm_Pool_Assessment_result].SourceObject = "frm_blank"
End If
```

The above IF statement makes use of the visible function – as common sense suggests this controls whether an object is visible/shown to the user. The above statement if to determine whether the Pool\_Assessment form should be shown as it is only relevant to new customers and it also controls whether the form to book pool assessments is shown or the form to show the results of the pool assessment are shown.

#### **CODE 5**

```
If Text29 = "Not interested" Then
    [subfrm_Lesson_payment_linkform].SourceObject = "frm_no_payments_needed"
    [save payments].Visible = False
ElseIf Text29 <> "Not interested" And Text66 = "can pay" And Text43 = "not paid" Then
    [subfrm_Lesson_payment_linkform].SourceObject = "frm_Lesson_payment_linkform"
    [save payments].Visible = True
ElseIf Text29 <> "Not interested" And Text66 = "can pay" And Text43 = "paid" Then
    [subfrm_Lesson_payment_linkform].SourceObject = "frm_paid_future_lessons"
    [save payments].Visible = False
ElseIf Text29 <> "Not interested" And Text66 = "cannot pay" Then
    [subfrm_Lesson_payment_linkform].SourceObject = "frm_no_payments_needed"
    [save payments].Visible = False
End If
```

The above controls the payment subforms, if a customer needs to pay, then the payment form allows them to do so, if they have paid then the payment details is shown. Otherwise if no payments are needed then the system states this.

#### **CODE 6**

Combo12 = Combo90

This is needed due to there being two search boxes – one for surname and one for swimmer ID. This makes sure that the combo boxes are always the same. It also mitigates against confusion i.e. if a user has just accessed Smiths record and then searches for swimmer ID 372, then Smith needs to change to correlate with the ID 372.

#### **CODE 7**

```
If [Delayed Payment] < Date Then
    stDocName = "qry_Update_delayed_payment_field"
    DoCmd.OpenQuery stDocName, acNormal, acEdit
End If
```

The above code deals with the exceptions of where customers delay their payment deadlines. Once the deadline is passed the code runs a query to show a report showing the details of the customer so that they can be contacted to allow them to pay. The query also updates the delayed payment field to null so that it does not create more confusion in the future.

#### **CODE 8**

```
If Text29 = "Staying" Then
    [Print Staying Swimmer Specific lesson slip].Visible = True
    [Print Moving swimmer specific lesson slip].Visible = False
ElseIf Text29 = "Staying>moving" Then
    [Print Staying Swimmer Specific lesson slip].Visible = False
    [Print Moving swimmer specific lesson slip].Visible = True
ElseIf Text29 = "Moving" Then
```

```

[Print Staying Swimmer Specific lesson slip].Visible = False
[Print Moving swimmer specific lesson slip].Visible = True
Else
[Print Staying Swimmer Specific lesson slip].Visible = False
[Print Moving swimmer specific lesson slip].Visible = False
End If

```

The above code is so that the correct button is shown for printing out lesson slips, dependant upon the swimmers status.



## CODE 9

```

Dim stDocName As String
Dim stLinkCriteria As String

If Text0 = Then
DoCmd.Close
stDocName = "frm_SWIMMERS_STAYING"
DoCmd.OpenForm stDocName, , , stLinkCriteria

```



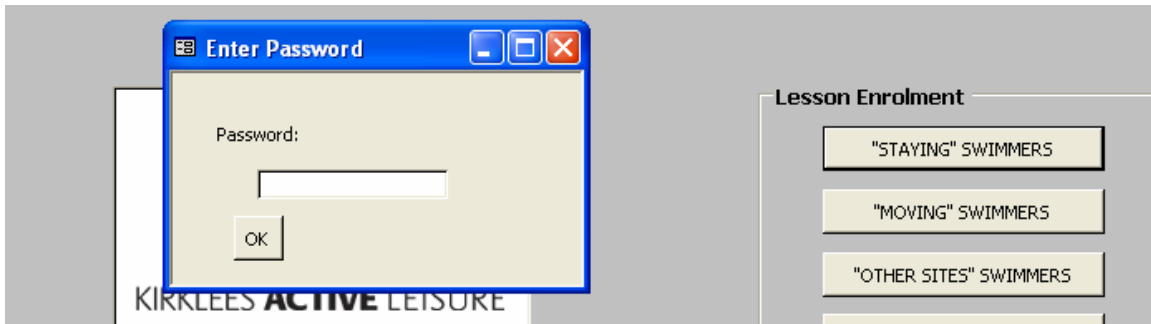
```

Else
    DoCmd.Close
    MsgBox "Only management can access this form"
End If

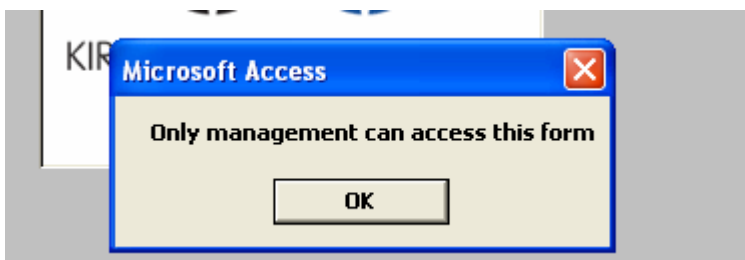
```

This code is for the security of the 'staying swimming form'. Due to the processing power the form holds it was decided that security was needed. Although the security is not very technical and relatively easy to break, its is there to act as a deterrent to any staff carrying out processing actions they should not.

When the user clicks on the STAYING SWIMMERS button a password box appears:



The user then has to enter the correct password before the STAYING SWIMMERS form is opened. If an incorrect password is entered then a message box appears:



This security has been implemented for the Staying Swimmers, Moving Swimmers, Lessons and Lesson Management forms. This will not affect everyday use of the system.

## CODE 10

```

Private Sub Command15_Click()
    Stock.Value = Stock + 1

```

End Sub

This is a simple piece of code that helps with the stock control and is linked to a button on the Awards form. As it suggests, every time the button is clicked it adds one to the stock.

#### **CODE 11**

```
Private Sub Next_Record_Click()  
On Error GoTo Err_Next_Record_Click  
    DoCmd.GoToRecord , , acNext  
Err_Next_Record_Click:  
    MsgBox "Sorry, no more records to view."  
    Resume Exit_Next_Record_Click  
End Sub
```

This is some of the navigation code that simply takes the user to the next record. If there are no more records then the message is shown:



#### **CODE 12**

```
Private Sub Preference_3_AfterUpdate()  
    If Preference_3 = Preference_1 Then  
        MsgBox "Please ensure all preferences are different, thank you."  
    ElseIf Preference_3 = Preference_2 Then  
        MsgBox "Please ensure all preferences are different, thank you."  
    End If  
End Sub
```

This code is found on the MOVING SWIMMERS form and informs users if the 3<sup>rd</sup> preference that is added is the same as either the 1<sup>st</sup> or the 2<sup>nd</sup>. If this is the case then a message is shown to

ask the user to verify that the preference is correct (there are rare occasions where it may be agreed that a swimmer can submit the same preference to ensure they get that class).

## **Kirklees Active Leisure Swimming Lesson Enrolment and Management System**



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## 1. Swimmers

All swimmers, those currently within the lessons and potential customers, as well as everyone who has ever been registered, are administered through the swimmers section.

From the Main Menu, click the Swimmers button.

The Swimmers Screen will appear:

The screenshot shows the 'Swimmers Records' interface. At the top, there's a header with the system name and a 'Swimmers Records' title. Below this, there's a search bar with 'Search All Swimmers...' and filters for 'By Surname' and 'By Swimmer ID'. The main area is divided into several sections: 'Personal Details' with fields for Swimmer ID, Surname, Forename, DOB, Address, and Contact; 'Current Lesson Details' with fields for Lesson ID, Start Date, End Date, and Status; 'Future Lesson Details' with similar fields; 'Pupil Assessments'; 'Payments' with a dropdown for payment type and a 'Pay' button; and 'Actions' with buttons for 'Add Swimmer', 'Delete Swimmer', 'Add Swimmer', 'Print Selections', 'Add at Event', and 'Import All Swimmers Data'. The bottom of the screen shows a Windows taskbar with various icons.

From this screen you can

1. Search for any swimmer by both Surname or Swimmer ID.
2. View the records on any swimmer who has ever been at your pool
3. Add new pupils
4. Amend all pupil data
5. Record details of disability or temporary difficulty
6. Print selections from the data
7. Record the Ethnicity of the Pupil
8. View if any payments are needed
9. View the current and next lesson course
10. View and set the swimmer status
11. Purchase Awards for a swimmer

## 12. Add Guardian details

### Creating a Swimmer Record

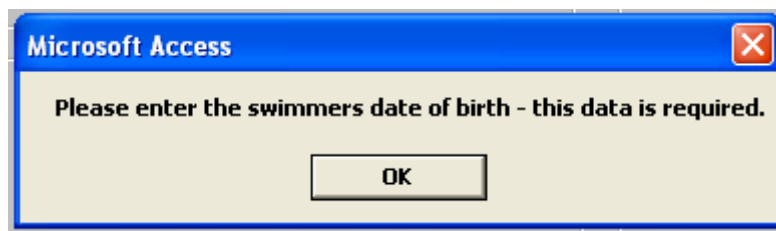
On the Swimmers form shown above click on 'Add Swimmer'.

An auto number will be created for the swimmer ID and the data will be cleared ready for the new details to be entered.



The screenshot shows a Microsoft Access form titled 'Swimmers'. It contains several text boxes for data entry. The first box is labeled '(AutoNumber)' and contains a value. Below it are several empty text boxes. One box contains the text 'Huddersfield'. At the bottom of the form, there are four buttons: 'Save', 'Add Swimmer', 'Delete Swimmer', and 'Add Swimmer' (repeated). There are also navigation buttons (back, forward, etc.) above the 'Save' button.

The minimum amount of data which should be added is the swimmers name, dob and telephone number. If these are not entered a message will appear asking for them to be completed.



Fill in the fields and click on Save.

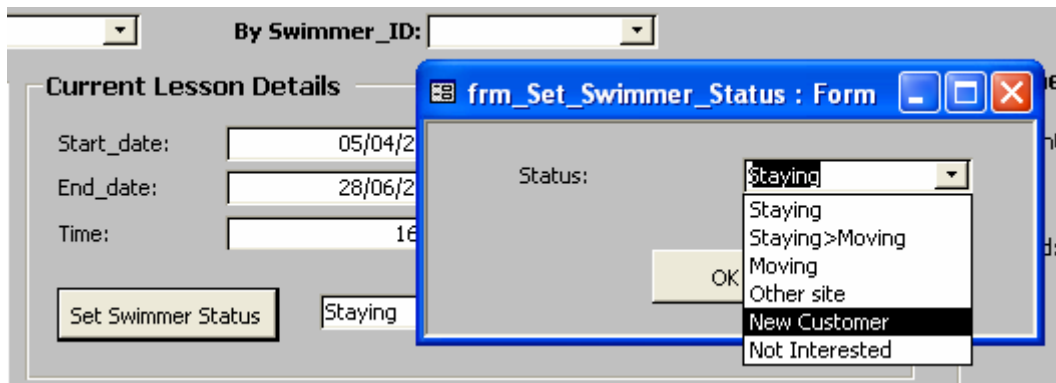
### Further Details

If possible and it may be advantageous to complete the full swimmer details.

Once a swimmer has been added it is also necessary to add a guardian relationship. Click on the Add Guardian button. Then if the guardian already exists, search for them via the search box and click on assign relationship. Otherwise add their details and then add the relationship to the relative swimmer.

### Swimmer Status

It is essential that when you add a swimmer to the system you set their status, as the status is central to the whole enrolment procedure. This is done via the set status button on the Swimmers form. Simply click on the 'Set Swimmer Status' button and then use the drop down menu to select the correct option:



### Current Customers

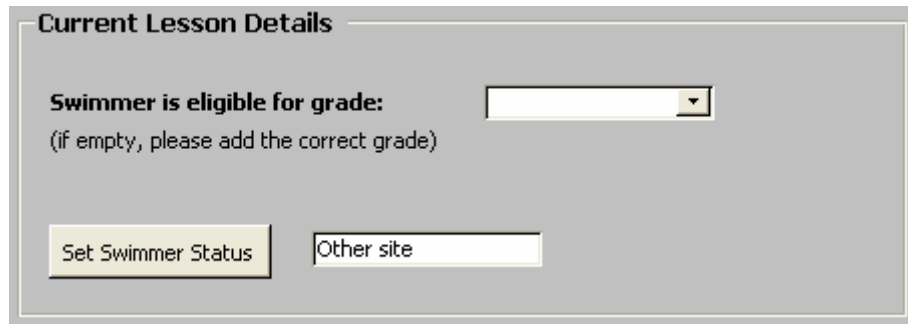
If the swimmer is current then their status will not be set until the swimming teachers indicate all the swimmers statuses. Once this is indicated, the statuses should be set, thus preparing them for the next cycle of lesson enrolment.

### Other Sites Customers

As you are most likely aware, other sites customers receive slight priority over brand new customers. Although, the only way they can enrol onto a grade is if they show proof of their grade from the previous teacher.



Once this has been shown, the details must be logged in the correct section on the Swimmers form:



The screenshot shows a form titled "Current Lesson Details" with a grey background. Inside the form, there is a label "Swimmer is eligible for grade:" followed by a dropdown menu. Below this label is a note in parentheses: "(if empty, please add the correct grade)". At the bottom left of the form is a button labeled "Set Swimmer Status". To the right of this button is a text input field labeled "Other site".

This then aids the enrolment procedure as detailed in a later section.

### **New Customers**

Again as you are most likely aware, new customers may have the option of taking a Pool Assessment in order to determine which grade they enter at. These are booked via system. If a pool assessment is not booked the swimmer MUST enter the lessons at the bottom grade dependant up on their age (water confidence or grade 1).

### **Pool Assessments**

Once a customer's status is set as New Customer the Pool Assessment option will appear near the bottom of the screen – to book a Pool Assessment you need to click on the 'Pool Assessment Details' button and complete the details.

**Pool Assessment Details**

**Pool Assessments**

Swimmer\_ID: 41

Staff\_ID: 0

Staff\_Name: ,

Time:

Date:

Grade\_Assessed\_for:

Grade\_Qualified\_for:

Receipt\_No:

Comments:

Save Exit

The Swimmer ID will appear automatically – and will correlate with the swimmer record you were previously viewing. You then need to complete the remaining details. The system will automatically check for any double booked assessments and will present you with an error message. The Grade Qualified For field should not be filled in at this stage. You should then save the details and exit the form.

Once the assessment is completed you can re-access the form by same route i.e. finding the swimmers record and clicking on the ‘Pool Assessment Details’ button – this will recall the saved data. The Grade Qualified For field should be completed – this is what is used to aid the enrolment procedure.

## **2. The Enrolment Procedure**

This section of the manual details what steps must be taken within the enrolment procedure. The whole procedure involves:

1. Setting the swimmers status (described in the previous section).
2. Printing the Lesson Slips.
3. Processing Staying Customers.
4. Processing Moving Customers.
5. Enrolling Other Sites Customers.
6. Enrolling New Customers.

### **Printing Lesson Slips**

The lesson slips can be printed out individually or in mass i.e. for everyone. To print individual lesson slips, go to the Swimmers form and at the bottom right hand corner – in Actions section, there is a button to print individual lesson slips for the swimmer who is shown. To print all the necessary lesson slips, go to the Lessons form and click on the ‘Print ALL Lesson Slips’ button. This prints the lesson slips, which are sorted into each lesson, therefore they are immediately ready to be handed over to the swimming teachers.

### **Processing Staying Customers**

The processing of staying swimmers is done primarily through the ‘Staying Swimmers’ form, which is protected by a management password. Details on how to process staying customers is outlined in the Management Manual.

### **Processing Moving Customers**

The processing of moving swimmers is done primarily through the ‘Moving Swimmers’ form, which is protected by a management password. Details on how to process moving customers is outlined in the Management Manual.

### **Enrolling Other Sites Customers**

This is done via the ‘Other Sites Swimmers’ form. As already established, the swimmers details must be taken and proof of their current grade must be stored within the Swimmers form.

Within the Other Sites Swimmers form is a list of all swimmers from other sites – you need to select the correct swimmer (TIP: click within the list and then use the keyboard to ‘jump’ to the

correct starting letter of the swimmers surname). Once the correct swimmer is selected each of the lessons the swimmer is eligible for will be shown (dependant upon the grade stored when the swimmer provided their proof from their previous teacher).

Only the lessons that have availability are shown – it is possible that no lessons are shown because the lessons for that particular grade may already be full. If there are lessons available, simply scroll through them to get their details:

**List of swimmers**

Kelly, Paul  
Stead, Jon

**Personal Details**

Swimmer\_ID: 27  
Grade\_eligible\_for: 3

**Lesson Availability Details**

Grade	Day	Time	Teacher
3	Thursday	16:00	Blackford, Madline
3	Thursday	16:30	Kwisxchxz, Anja
3	Saturday	10:30	Ripley, Jo
3	Saturday	11:00	Cornish, Sue
3	Saturday	11:00	Morrison, Phillip
3	Saturday	11:00	Ripley, Jo
3	Saturday	11:30	Ripley, Jo

**Specific lesson details**

Lesson\_ID: 1230  
Start\_date: 06/07/2006  
End\_date: 28/09/2006  
Time: 16:00  
Day: Thursday  
Teacher\_Name: Blackford, Madline  
Availability: 12

**Available lessons**

Add to Lesson

Once a lesson has been decided upon, click on the 'Add to Lesson' button as shown above (bottom right). This will add the swimmer to the selected lesson. A payment will then be needed – this can be done via the same screen or via the Swimmers screen (it is the users choice). To add a payment, select the discount and the payment method and then enter the receipt number – this must be added for the payment to be saved!

**Payments**

Discount: None  
Kirklees Passport  
Other

Method: Cash  
Cheque  
Debit Card  
Credit Card  
Other

Date: 11/04/2006

Receipt\_No:

Save

Once the payment has been saved, the payment section (shown above) will turn into the paid form:

**Payments**

**Paid...**

Receipt\_No: 1938646347

Grade: 1

Day: Wednesday

Time: 16:30

Teacher: Donarski, Jane

The swimmer is now enrolled and fully paid.

### **Enrolling New Customers**

The same process as that for the 'Other Sites Swimmers' is followed, but all transactions are done via the 'New Swimmers' form. The layout and the actions are exactly the same. The only

difference being that the eligible grade is taken from the pool assessment result or is simply set to the lowest grade.

The payments are also taken via the same method as with the Other Sites Customers.

### **3. Taking Payments**

It is described above how to take payments for Other Sites Swimmers and New Swimmers – this can be done via either the relative form (i.e. the Other Sites Swimmers form and New Swimmers form) or the Swimmers form. For the staying swimmers and moving swimmers all lesson payments can only be taken via the Swimmers form. However, the same process and procedures is followed.

### **Refunds**

These are possible for all swimming lessons, although, management authorization is needed. Refunds are discussed in greater detail within the Management Manual.

### **4. Lesson Management**

All the current Lessons are managed within the same form, namely 'Lessons', which is accessible from the main menu. It is possible to:

- Create new lessons plans.
- Edit lessons i.e. time, teacher, grade being taught etc.
- Print lesson availability.
- Print lesson registers.

### **Create New Lessons Plans**

Within the lesson form there is a single button which creates the new lessons for forth coming lesson cycles. It simply, creates exactly the same lessons as what were are being taught within the current cycle, but with new start and end dates. If new lesson plans are not created then there will be no new lessons for the swimmers to be enrolled onto, therefore this feature needs to be used before any enrolment occurs.

## Edit Lessons

This feature allows for any lessons details to be changed.

You need to select the Lesson you wish to edit and then the Lesson details will appear in a pop up box. Here you simply need to over write the details that require changing. To do this click on the details and press 'Del' on your keyboard, then enter the new details.

The screenshot shows a 'Lesson Details' pop-up window with the following fields:

- Lesson\_ID: 239
- Start\_date: 08/07/2006
- End\_date: 31/10/2006
- Time: 10:00
- Day: Saturday
- Teacher: 13
- Grade: 1

Buttons: Save, Exit

The background shows a list of lessons with columns for Lesson ID, Day, Time, and Teacher. The selected lesson is Lesson 1, Saturday, 10:00, Morrison, Phillip.

All lesson details, except the Lesson ID may be changed through this form.

## Lesson Reports

Several reports can be printed from the Lessons form:

- Lesson Availability – useful during enrolment to advertise what lessons have spaces available. This report shows all lessons – even those that are full, but these are indicated as being full on the report.
- Individual Registers
- All Registers

Each report has a button on the Lessons form, that, when clicked will show a preview of the report and from the preview can be printed.

## 5. Awards Management

Through the Awards form of the system it is possible to:

- Add an award
- Delete an award
- Edit award price
- Control Stock

### Add an Award

This feature is to be used when a new award is introduced to the swimming lessons.

To allow management of a new award i.e. stock control, the award must be added to the system. To do this, click on the 'Add an Award' button, this will clear the data fields allowing you to enter the necessary details. The Award ID field will turn to 'autonumber' this should not be edited – the screen will look like:

The screenshot shows a software interface for managing awards. It is divided into two main sections: 'Award Details' on the left and 'Actions' on the right. The 'Award Details' section contains several input fields: 'Award\_ID' with a dropdown menu showing '(AutoNumber)', 'Type' with a dropdown menu, 'Grade\_Eligible' with a dropdown menu, 'Stock' with a text input field containing '0', 'Price' with a text input field containing '£0.00', and 'Description' with a text input field. The 'Actions' section contains five buttons: 'Add Award' (highlighted with a dashed border), 'Delete Award', 'Add new stock +1', 'Add new stock +10', and 'Change Specific Award Price'.

### Delete an Award

This feature should be used for such things as if an award is taken out of production.

To delete an award you simply need to click on the button. This will show a message asking you to verify your actions, click on 'Yes' if you wish to delete the award or 'No' if you wish to cancel the action.

### Edit Award Price

This feature allows you to change the prices of awards. Simply clicking on it will produce the pop up form shown below:





From here press the 'Del' button on your keyboard and enter the new price – the system only allows reasonable prices e.g. less than £5. If an award is actually priced above the validation then the system administrator will need contacting.

### **Control Stock**

On the Awards form there are two buttons to help control stock – these buttons are 'Add 1' and 'Add 10'. These are to be used when new stock is added. The stock levels within the system are updated every time an award is purchased, to record a purchase, follow the instructions below.

### **Recording Award Purchases**

When a swimmer purchases an award this needs recording within the system (for the financial records and for stock control). This can be done via the Swimmers form, within the Actions section click on the button 'Add an Award'. This will produce the pop up form:



The Award ID drop down menu shows the possible awards the swimmer is eligible for, e.g.:

Current Lesson Details

Start\_date: 05/04/2006 Day: Wednesday  
End\_date: 28/06/2006 Grade: 1  
Time: 16:00 Teacher\_Name: Kwiechyn, Anita

Set Swimmer Status Moving

Future Lesson Details

Future lesson not yet assigned

Payments

No payments due

Awards Purchase

Award\_ID  
Date:  
Receipt\_No:

6	Grade 1	Badge
7	Grade 1	Certificate
16	10 metres	Badge
17	10 metres	Certificate

Stock Control Exit

From the above example, you can see that the swimmer has just completed Grade 1 and is now moving up a grade, therefore only the Grade 1 awards are available for purchase.

Once the correct award has been selected, the receipt ID must be entered (you will not be able to proceed without entering the receipt ID). You then must click on the ‘Stock Control’ button, followed by the ‘Exit’ button.

## 6. Staff Management

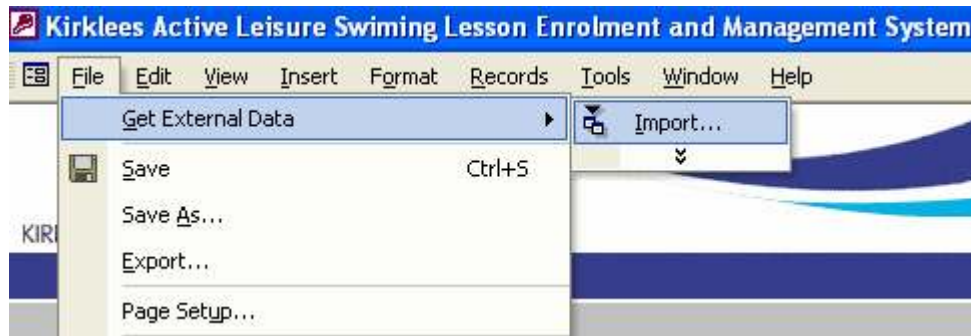
This section of the system is purely for recording staff details such as their roles/jobs, their weekly availability (to aid with covering shifts) and their contact details. It is simply a basic add on for the system.

# Management Manual

## Getting Started

### Importing Existing Data

Once the Pool IT system has been loaded, you can start to import any current swimmers you have in spreadsheets – this is done via the File > Get External Data > Import.



Because the Pool IT system is a relational data system, it is necessary to load data into the some of the files before full usage can be made of others.

### Back Ups

It is advised that regular backups are taken to mitigate against any problems.

This can be done by simply creating a blank Access database on a USB memory stick (costing as little as £5.98 from [www.dabs.com](http://www.dabs.com)). Then at the end of each day – if any transactions have occurred and/or any data been changed – it is possible to open the blank database and then follow the directions (as above but in the Back Up database)...

File > Get External Data > Import > Find and Select the actual working database > Select All > OK

This will back up the complete system including the data it holds.

Each time the a new back up is taken it should be clearly and accurately named – it is suggested that the following format be taken for backup database names; date followed by a description i.e. 20060407\_Lesson\_system\_backup. Also each time a backup is taken a new database should be created. Dependant upon your requirements redundant i.e. those that will NEVER be used again can be deleted but once they are deleted they cannot be retrieved!

The USB stick should be kept in a safe and secure place due to back up reasons but also Data Protection Reasons. The key points to remember are:

1. Make back ups.
2. Make them regular.
3. Keep the Back up in a safe place

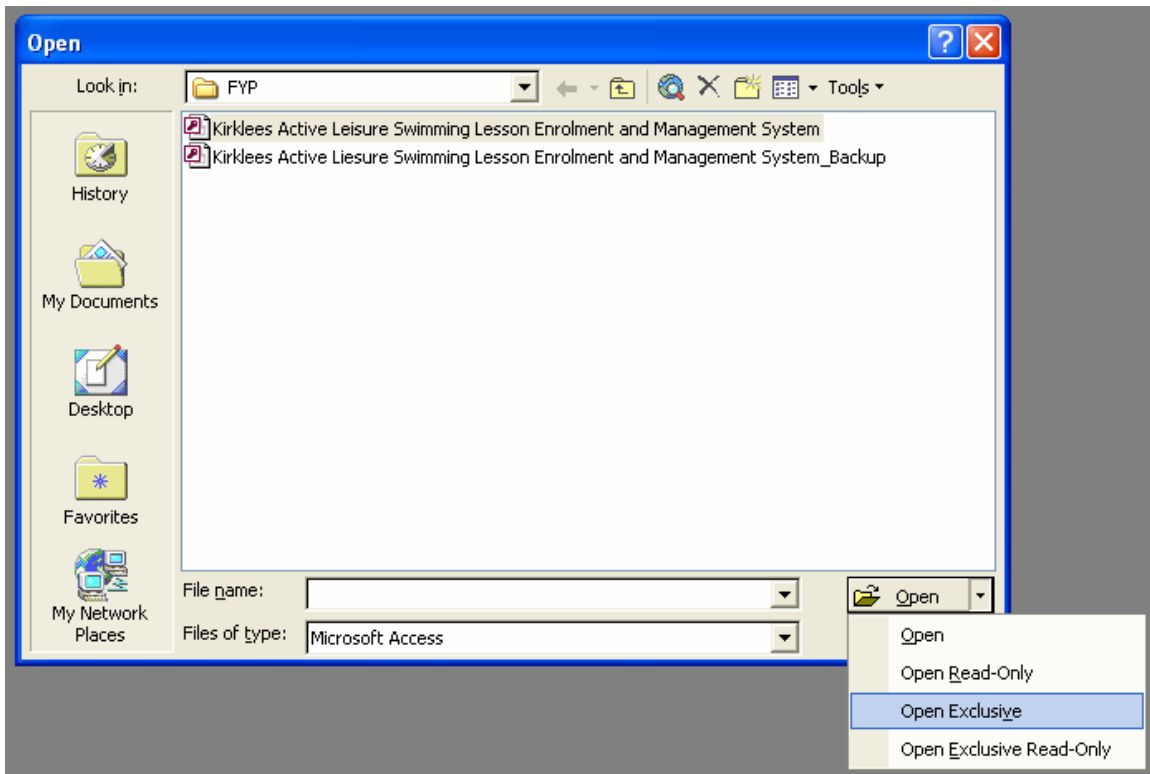
As with any computer system, the keeping of regular backups is essential.

If you do not make and **keep regular backups** then it is likely that no-one can help you should anything happen to the data.

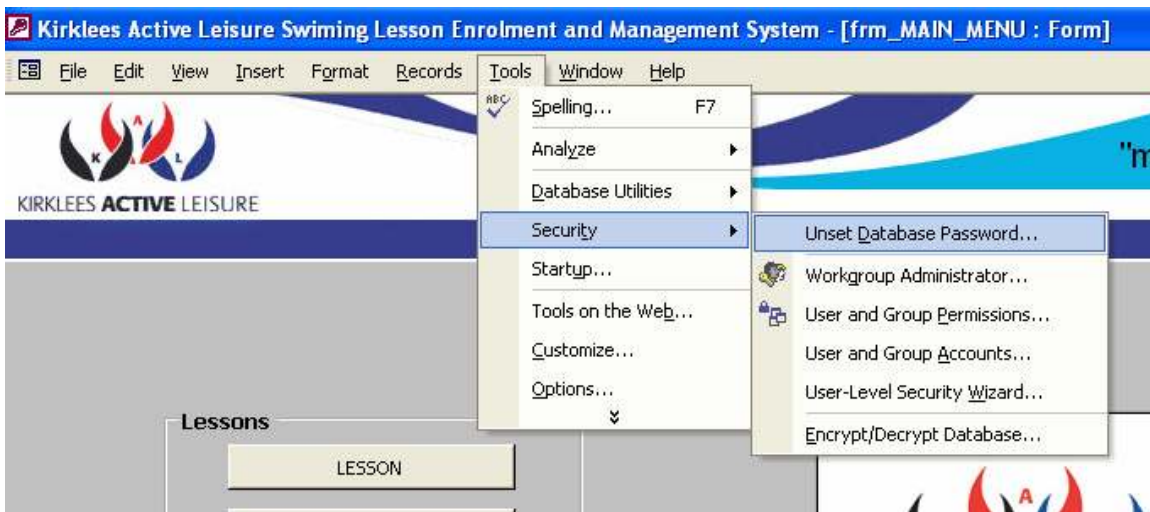
### **External security**

The database has a password in order to protect the system and the data from corruption. This password is set at 'Password' for the initial opening of the system – but it is important that this is re-set to your own personalised password. You can do this by carrying out the following steps:

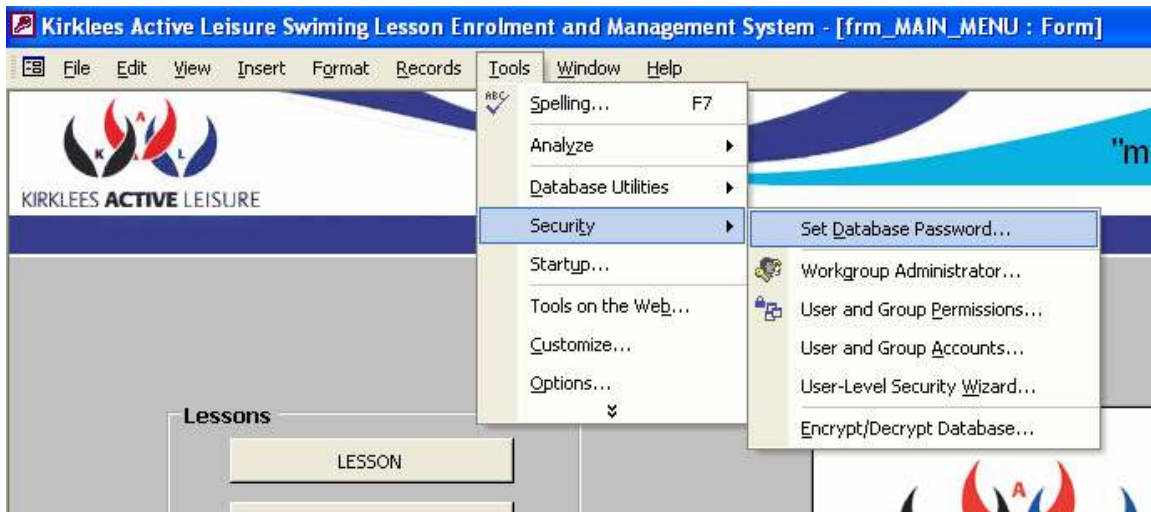
1. Open the system exclusively, as shown...



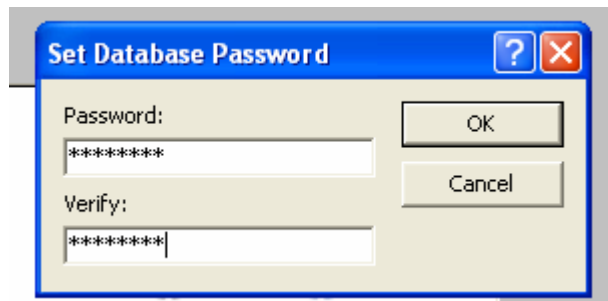
2. Enter the password as detailed above and click on 'OK'.
3. Once the system has opened, you must change the password. This is done by clicking on the menus as shown below...



4. This will ask you to enter the current password, which you will need to enter. Once entered, this deletes the password security, therefore you must immediately re-set the password.
5. To do this follow the same menus as above – although this time it will say 'Set database password'.



6. Now, simply enter a password of your choice and verify it by entering it for a second time...



The above process should be followed every time you want to reset your password.

### Internal Security

Within the system several tables (Staying Swimmers, Moving Swimmers and Lessons Finances) have security to allow for only managers to gain access to. The passwords for these tables are to ensure no mal practice occurs and therefore they should be kept secret. The password details will be set to the users requested passwords at the initiation of the system. If they need changing then the administrator will need contacting.

### Passwords

Passwords exist in order to protect systems and data within systems; therefore there are several guidelines that should be followed when dealing with passwords:

1. Never write them down, talk about them or give other people permission to use them.

2. Make them a minimum of 6 characters long and include numbers and letters in both upper and lower case.
3. Do not make them easy to guess or obvious.

### **Processing of Staying Swimmers**

As stated above, this form (accessible from the main menu) is protected by a password. Once access is gained the first step is to assign all swimmers to the same classes as what they are currently in by clicking on the 'Assign Staying Customers to Classes'. This automatically assigns ALL staying swimmers to the relevant classes. This prepares the system for the payments from the staying customers.

Once the Staying Customers payment deadline has passed, you must once again access the Staying Swimmers form. This time you need to click on the 'Complete Staying Customers' button, this deletes all non-paying staying customers from the new lessons and also changes their status to 'Not Interested'. Once this is complete, the staying swimmers will no longer need any attention.

### **Processing of Moving Swimmers**

The processing of the moving swimmers is some what more difficult. Each swimmer must first submit their preferences which are recorded into the system. Once the deadline for submitting preferences has passed it is then possible for the moving swimmers to be processed. This can be done in two ways:

1. Manually, by enrolling those swimmers with siblings (as identified by the system) first and then adding the remaining swimmers OR
2. Automatically assigning swimmers to classes in descending order of number of siblings i.e. assigning swimmers with most siblings first. There is a button for each group of siblings i.e. one button for assigning swimmers with 3 siblings, one button to assign swimmers with 2 siblings etc.

Once all swimmers have been assigned, the system will then be ready to take payments.

Once the payments deadline passes for moving swimmers, you will need to complete the Moving swimmers by the same method as followed with the staying customers i.e. the 'Complete Moving Swimmers' button on the Moving Swimmers form.

## The Financial Reports

All financial reports can be accessed from the main menu. To access them you will have to enter a password. Once access is gained, you can view any report by clicking on the relevant button, thus producing the print preview of the report.

## Other Financial Issues - Refunds

Although refunds are infrequent, they do occur. Refunds are processed via the Swimmers form. To do so you simply need to click on the refund button situated at the bottom of the 'Paid' section of the swimmer form...

The screenshot displays a web application interface. On the left, there is a section titled 'Lesson Details' with input fields for 'date' (05/04/2006), 'Day' (Wednesday), and 'Grade' (1). Below this, another 'date' field shows 28/06/2006. A modal dialog box titled 'Refund?' is centered on the screen, asking 'Are you sure you want to refund this swimming lesson?' with 'Yes' and 'No - Cancel refund' buttons. To the right, the 'Payments' section includes a 'Paid...' subsection with fields for 'Receipt\_No' (1938646347), 'Grade' (1), 'Day' (Wednesday), 'Time' (16:30), and 'Teacher' (Donarski, Jane). A red 'Refund' button is located at the bottom right of the 'Payments' section.

Clicking on 'Yes' will run a query which will delete the record from the Leeson Payments table and change the swimmer status to 'Not Interested'.



## Appendix P Testing Table

Extreme, exception and validation testing results table:

Test No.	Relevant Form	Description	Outcome
1	Lessons: Clicking on 'Lesson Details Button'	The start date for future lessons should not be able to be changed into the past or to a date that is before the end of the current lessons	As expected – the earliest it could be set was the day after the last lesson of the current course.
2		The end date for future lessons should only be extendable by 3 weeks thus creating a maximum 15 week cycle.	As expected – error message shown if attempted to extend by longer.
3		The lesson time can only be changed if there are <3 lessons currently on that time and day (the pool has a capacity of 3 lessons at once).	Did not Exist – needed implementing, to ensure double bookings did not occur.
4		The lesson day had the same validation as above.	As above.
5		The lesson teacher can only be changed if they are not already booked for that slot (time and day/date).	As expected – error message shown if potential double booking.
6		The grade is validated by the drop down menu and no other entry is acceptable.	As expected.
7	Lessons: Clicking on 'Add Next Courses Lessons Button'	The lessons should only be able to be added once	As expected – action cancelled and message saying “Lessons already exist” appears if more than 2 lessons for the same date, time, grade and teacher exist.
8	Swimmers	If when a new swimmer is added all the details i.e. forename, surname, address, DOB, telephone no. are the same as an existing swimmer – a duplication warning should appear.	As expected.
9		Current and future lesson details cannot be edited.	As expected – all attributes are locked.

10		Current lessons subform determined by lessons with start date <=Today.	The query used in the subform used the criteria <today rather than <=. This was changed.
11	Swimmers: Add Pool Assessments	When a new pool assessment is added, it should not be possible to double book a pool assessment.	As expected – if time, date and teacher match a previously booked assessment then the action will be cancelled and an error message shown.
12		Duplicate receipt numbers are not accepted.	As expected – error message shown.
13	Swimmers: Add an Award	Only the awards eligible should be shown i.e. if in grade 1 then only grade 1 awards and distances should be shown.	As expected.
14		Duplicate receipt numbers are not accepted.	As expected – error message shown.
15	Awards	The drop down lists should be restricted to the list and no other entries.	As expected – error message if anything different entered.
16	Staying Customers	The ‘add staying swimmers to lessons’ button can only be clicked once.	After it is clicked the button is disabled.
17		The ‘complete staying swimmers’ button should get the user to verify their actions.	Verification message shown asking user if they are sure they want to proceed with the action (deleting non payers from booking sheets and changing status to not interested)
18		The exception to the above is for those swimmers who have agreed on extended deadlines. They should not be deleted until the new deadline date has passed.	As expected.
19	Moving Customers	The possibilities for the preferences should be limited to the grade the swimmer is moving into.	As expected.
20		The exception to the above is swimmers who are classed as Staying>Moving – the preferences should be limited to the grade the swimmer is currently in.’	As expected.

21		Adding to lessons: if the lesson availability is 0 then the 'Add to lesson' button should be disabled.	As expected.
22		The 'complete moving swimmers' button should get the user to verify their actions.	Verification message shown asking user if they are sure they want to proceed with the action (deleting non payers from booking sheets and changing status to not interested)
23		The exception to the above is for those swimmers who have agreed on extended deadlines. They should not be deleted until the new deadline date has passed.	As expected.
24	Other Sites Customers	The only lessons that the swimmer should be able to enrol onto are those that are of equivalent grade to the proof they provide (obtained from their previous teacher).	As expected.
25		The exception to the above is for those swimmers who have agreed on extended deadlines. They should not be deleted until the new deadline date has passed.	As expected.
26		Adding to lessons: if the lesson availability is 0 then the 'Add to lesson' button should be disabled.	As expected.
27	New Customers	Swimmers should only be able to be added to Water Confidence lessons.	As expected.
28		The exception being if a swimmer has had a pool assessment they can enrol onto a class authorised by the pool assessment.	As expected.
29		Adding to lessons: if the lesson availability is 0 then the 'Add to lesson' button should be disabled.	As expected.

## Appendix Q Quantitative Evaluation

Quantitative evaluation using the method shown in section 9.7:

Task	Old System			New System	Annual Saving
	Time taken	Costs	Calculations		
Adding STAYING Customers to Booking Sheets	This task comprises of simply copying details from the lesson slips onto the booking sheets (either trusting that the slip details are correct or verifying the details on old registers). Approx 150 swimmers, each taking 1-2min each dependant on if verification takes place.	Receptionist wage is £7.45 per hour.	Min of: $2.5\text{hrs} \times 7.45 = 18.63$ Max of: $5\text{hrs} \times 7.45 = 37.25$  Multiplied by 4 (number of 13 week lesson cycles a year) = £74.52 - £149.00	Click one button – ‘Assign staying customers’	£74.52-£149.00
Adding MOVING Customers to Booking Sheets	This task involves either grouping the swimmers by first/second/third preference or by those who have siblings within the swimming lessons. This grouping can be very tedious and mistakes are easy. It takes approximately 1-2 hours to do this	Duty Managers wage is £8.25 per hour.	Min of: $1\text{hr} \times 8.25 = 8.25$ Max of: $2\text{hrs} \times 8.25 = 16.50$  Multiplied by 4 (number of 13 week lesson cycles a year) = £33.00 - £66.00	The grouping of swimmers by family is done by the system and therefore takes no time. The actual assigning of lessons will probably take the same length of time as before	£33.00 - £66.00

Searching booking sheets for customer records to save payments	Although this is not a large task it can waste approximately 10 seconds per customer due to handwriting and simple human errors. When you are dealing with approximately 400 customers this adds up	Receptionist wage is £7.45 per hour.	$10 \text{ seconds} \times 400 = 67\text{mins or } 1.1\text{hrs}$ $1.667 \times 7.45 = £8.20$ Multiplied by 4 (number of 13 week lesson cycles a year) = £32.80	Simply takes the time to type the first few letters of the swimmers surname and pressing enter i.e. 3-4 seconds.	£32.80
Deleting non payers from the booking sheets	This task requires searching for the records on the booking sheets and crossing them off. It is usually followed by replicating the booking data onto new booking sheets so they are not full of crossings out. The complete task will take about 15 min to cross out non-payers and then about 1 hour to recreate the tidy booking sheets.	Duty Managers wage is £8.25 per hour and Receptionist wage is £7.45 per hour.	$\frac{1}{4} \text{ hrs} \times 8.25 = £2.06$ and $1 \text{ hr} \times 7.45 = £7.45$ Done once for staying customers and once for moving customers. Multiplied by 4 (number of 13 week lesson cycles a year) = £76.08	A simple click of a button – one button for staying customers and one for moving customers.	£76.08
Creating lesson availability posters	This involves tallying up the spaces available in each class and recording them on an existing spreadsheet. Then printing out. This	Receptionist wage is £7.45 per hour.	$1/2 \text{ hrs} \times 7.45 = £3.73$ Multiplied by 4 (number of 13 week lesson cycles a year) = £14.92	A system has a report which contains up to date figures and can be viewed if a customer asks how many places in class Z or printed at the click	£14.92

	has to be done on a regular basis during enrolment i.e. at least five times. In total takes 30min			of a button.	
Creating Registers	Taking into account there are 45 lessons it takes approximately 2 min to complete a register, therefore about 1½ hrs.	Receptionist wage is £7.45 per hour.	$1\frac{1}{2}\text{hrs} \times 7.45 = \text{£}11.18$  Multiplied by 4 (number of 13 week lesson cycles a year) = £44.72	Clicking on a button prints all registers or another button prints individual registers for specified classes.	£44.72
Creating Balance Sheets	This requires tallying up the number of Kirklees Passport discounts for each lesson and for each day. Then working out the profits/losses for each lesson and for each day. Considering 45 lessons and usually some investigations due to staff not indicating whether any discount was given, this task could take up to 3hrs.	Duty Managers wage is £8.25 per hour.	$3\text{hrs} \times 8.25 = \text{£}24.75$  Multiplied by 4 (number of 13 week lesson cycles a year) = £99.00	Clicking on the relevant button prints the financial summaries/balance sheets – these can also be edited if prices rise.	£99.00

## **Appendix R QUEST Evaluation**

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### **QUEST Evaluation**

The QUEST questionnaire works on a scoring basis of 0-4 for each section. If a score of 0 has been given it means that there is nothing in place to meet the criteria where as a score of 4 means the criteria has been met as well as is possible. Quest operates a grading system based upon the scores (<http://www.quest-uk.org/>):

- Registered above 60%
- Highly commended – 75% to 84%
- Excellent – 85% and above

Currently, based on the results for the entire questionnaire, The Stadium Leisure Complex has a score of 73%. As you can see from the grade ranges above, this puts the complex just short of ‘Highly Commended’.

The following are the relevant sections of the questionnaire to this project, along with the questions that appear under each heading:

(NOTE: all answers shown below are specifically for the introduction of the Swimming Lesson Enrolment and Management System. Complete answers would relate to the whole business environment and not just the one specific system. The complete answers have not been documented as they are outside of the scope of this project).

#### **1. FOP 1 – Facilities Operations 1 – Systems, Standards and Inspection**

Q Are your staff trained in how to instil these quality procedures?

A All staff have or will shortly be having a training session given by the Duty Manager on how to use the system and in addition there is a user manual at the staffs’ disposal = 4

Q Are the responsibilities for statutory inspection defined, planned and implemented?

A The legal requirements to keep financial records such as receipt numbers is known of and is adhered to = 4

#### **2. CR 1 – Customer Relations 1 – Customer Care**

Q Do staff respond positively to enquiries and sales opportunities?

A Once full training has been completed then staff will have the capability of using the system which will be an helpful tool when dealing with lesson related queries and also when completing sales = 4

Q Do you think that customer information is readily and easily available?

A As above - staff will be able to inform of lesson availability, lesson details such as syllabus, time, grade, teacher etc. Additionally, these details can be printed out at the click of a button thus ensuring for up-to-date public displays.

### **3. CR 5 – Customer Care - Reception and Administration**

Q Do you think the admission and booking arrangements are user friendly and effective?

A The booking arrangements are user both user friendly and effective. The user friendliness exists via the features of the system in that it is easy to find information and details on specific things

Q Do you think that the system for all bookings is consistent, effective and comprehensive from enquiry to booking completion and review?

A The system for all swimming lesson bookings is as consistent as it possibly can be. The inconsistencies are due to different types of customers requiring different data. Although, from a high the processes are all the same i.e. set current status, add grade eligible (automatically done for staying customers, done via preferences for moving customers, done via proof of grade for other sites customers and done via pool test results for new customers).

Q Are staff responsibilities and their authority limits defined, known and implemented for bookings?

A The Duty manager has always been responsible for the processing of current customers therefore a password has been assigned to all forms that are capable of lesson processing (simple browsing, printing, adding other details are still possible for all).

### **4. STAF 1 – Staffing – People Management**

Q Are the staff suitably qualified and trained to perform their duties?

A Training has been offered to all relevant members of staff and a complete user manual is available to all members of staff so they always have some form of help available.



### **5. SDR 3 – Service Development and Review – Continuous Improvement**

Q Do you think that regular performance reviews are carried out to determine the effectiveness of the Organisation in pursuing the ‘Business Plan’?

A The system is a useful aid for reviews in that it creates statistics for lessons and it has potential for a number of reports to be created at a later date. The onus is on the business to actually carry out the reviews using the system.

### **6. SDR 4 – Service Development and Review – Finance and Information Technology**

Q Does the organisation monitor income and expenditure?

A Yes, the financial reports can be viewed at any time within the enrolment and can be adapted or new reports can be created as and when needed.

Q Do you think that under performing income areas are identified and if so, do you think that appropriate action is taken?

A The reports will highlight underperforming grades/classes and also has the potential to highlight underperforming teachers. Whether action is taken is all down to how ‘true’ the management perceive the figures to be.

Q Does the Organisation enhance its service and management through effective use of Information Systems where appropriate?

A Yes.

Q Are the computer files stored to enable easy access by authorised users?

A Yes.

Q Does someone regularly back up the system and if so do you know who this is?

A Back up details and procedures are covered in the user manual and it is highly recommended that they are followed. Additionally, care for the backup data is detailed in the manual i.e. where to keep it for security purposes as well as preventing it from corruption.